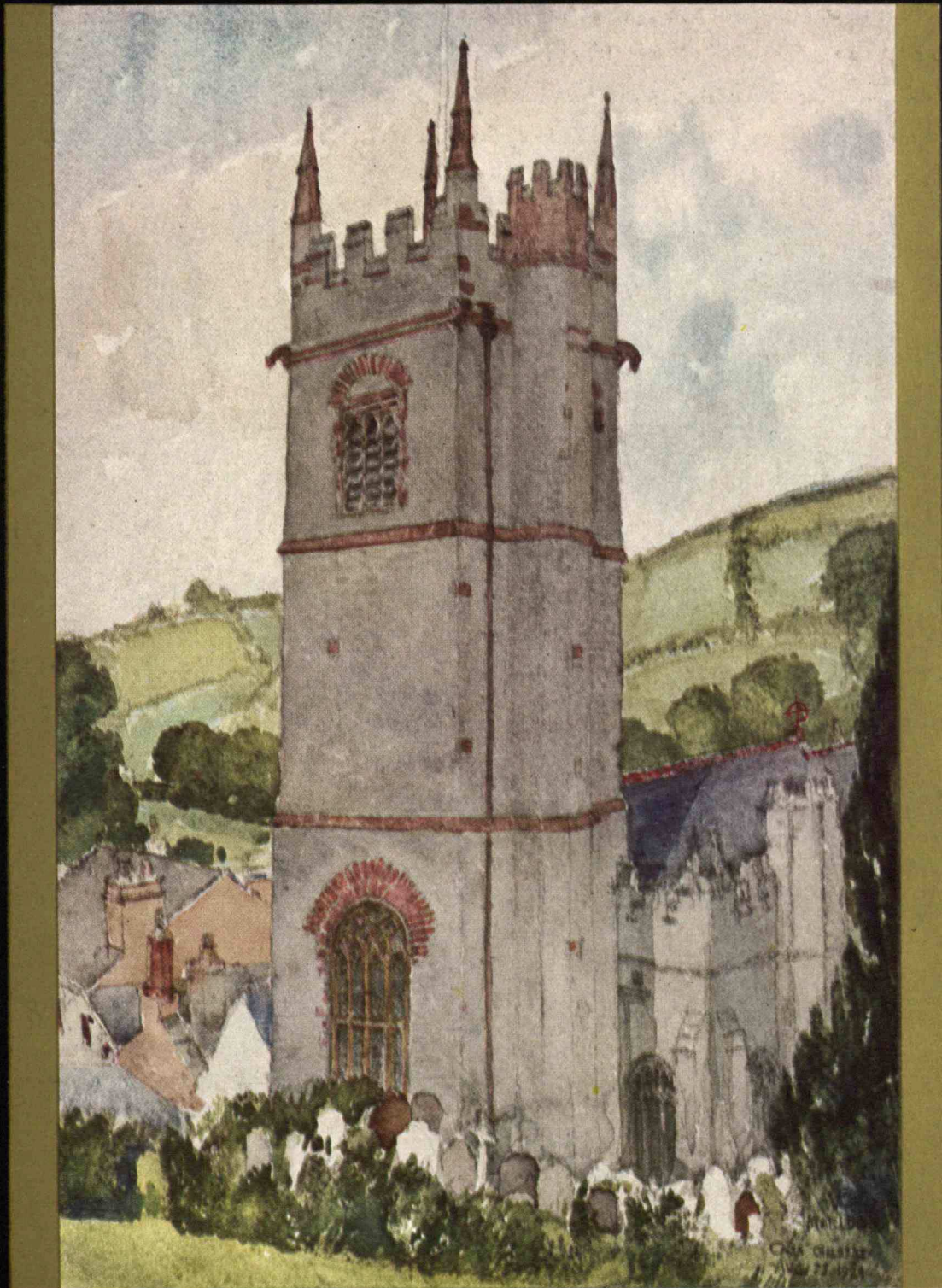


# THE TECHNOLOGY REVIEW

FEBRUARY 1931



# technology review

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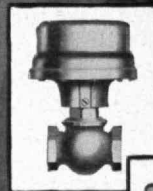
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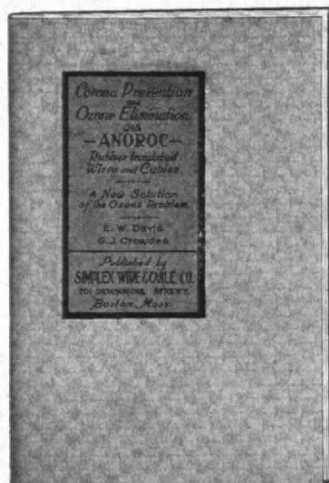
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## THE TABULAR VIEW

NICHOLAS MURRAY BUTLER scarcely needs an introduction to the world for he is known both here and in Europe as a prominent educator. His varied activities make an imposing list — too numerous to include in this column. Since 1902 Mr. Butler has been President of Columbia University, from which college he received his bachelor's, master's, and doctor's degrees. His dominant interest is in the field of education, where he is constantly facing the problem of indifference to higher education and prejudice as to its real significance. To quote from his annual report in 1925: "If Abelard came back, he would be confronted with the spectacle of countless numbers of men and women, all hugely pleased with the brightness of their own intellectual illumination, whose minds are blocked to the progress of reason by the barriers of prejudice and fanatical prepossession." ¶ Mr. Butler is aptly called a modern Abelard, confronted as he is with the well-meaning ignorance of an uncomprehending world, and he is ever trying to raise the standards of a people complacently accepting mediocrity for excellence. President Butler's reports are far from a perfunctory annual duty; they represent a valuable, up-to-date survey of conditions in education as they exist today. Although he has written many books, essays, and addresses which are comprehensive in scope, he comes back again and again to certain favorite subjects: democracy and government, philosophy and education, and international peace. His article entitled "Science Endangered" is an excerpt from his report for 1930 as President of Columbia University.

IN THESE days when it is fashionable to abominate royalty, more consideration might well be given to royalty's by-products. The power of royal prestige has been and may be a deciding factor in the introduction of everyday utilities. Let us consider two contributions of royalty to science. The instance described by Professor Williams in his article on page 229 is an example, for aluminum undoubtedly received an impetus toward a greater use by virtue of the glee of the Prince Imperial over a rattle made of it. Another example of royalty's aid to science was recorded in the December Review and sharpens the point — the popularization of chloroform by Queen Victoria's use of it at the birth of Prince Leopold. Royal patronage, we conclude, is a most effective means of advertising. ¶ Dr. ROBERT S. WILLIAMS, the author of "The Evolution of A Baby Rattle," was graduated from Technology in 1902. He received his Ph.D. from Göttingen in 1907 and was connected with the Department of Chemistry from that time until 1927. Since then he has had charge of the Division of Physical Metallurgy in the Department of Mining and Metallurgy. He is a member of the Chemical Society, Mining and Metallurgical Engineers, the American Academy, and the British Institute of Metals.

"INVENTION AND ECONOMICS" by B. ALDEN THRESHER deals with the problem of innovation in its effect upon society, a subject that the current business  
(Continued on page 220)



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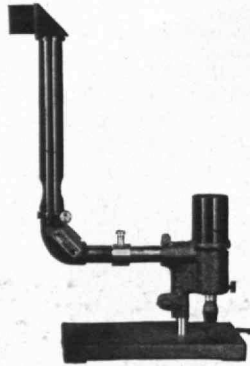
PULPSTONES, REFRACTORIES, POROUS PLATES, FLOOR and STAIR TILES, ABRASIVE AGGREGATE

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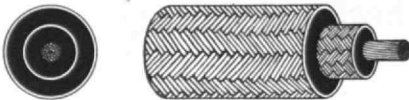
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## THE TABULAR VIEW

(Continued from page 218)

depression has given real immediacy. Elmer Davis in a recent letter to the Editor of the *New York Times* remarked: "Classical economics, again, tells us that if men are laid off because of an improved process, the saving will lead indirectly to the creation of new jobs somewhere else to take care of them. But every corner has its apple seller already. Till applied social science catches up with applied physical science, every improvement in the mechanics of living is a disaster for somebody and somebody's wife and children." ¶ Economists have been too arbitrary in assuming that invention is always helpful, for the subject has not been studied sufficiently. Mr. Thresher points out that there is a specific demand for systematic analysis of the economic effects of this principle of innovation in relation to modern life. The world looks to research on a scientific basis to predict the trend of results and to help solve this serious problem. This means that the economist must acquire the engineering as well as the financial attitude. ¶ Mr. Thresher was graduated from the Institute in 1920. For seven years he was engaged in engineering, executive and research work in textile, paper products and food products industries. In this connection he has contributed various technical articles from time to time to the *Textile World*. An active interest in economics led him to study further in this field beginning in 1927, and he received his master's degree from Harvard University the following year. Before becoming an instructor in the Department of Economics at the Institute in 1929, he held the Henry Lee Memorial Fellowship in Economics at Harvard University.

HAROLD E. LOBDELL, '17, is publisher of The Review and Dean of Undergraduates at M. I. T. His extensive study of railroad speeds answers questions one so often hears posed: what are the fastest trains, and are American trains as fast as those in Europe? Dean Lobdell is rapidly becoming an expert railroad statistician, an accomplishment to which few of us can aspire, but which all of us severally admire.

THE book reviewer for this issue is DR. JAMES A. TOBEY, who has been a frequent contributor to The Review. In November, 1929, he wrote the article about human longevity, "Forestalling Death," and in March, 1930, he contributed the article entitled "Business Discovers Health," showing how commerce employs science to aid public well-being. Dr. Tobey, who was graduated from Technology in 1915, has been very active in the service of the National Health Council. He has also served as health officer of Summit and West Orange, N. J., as representative of the State Department of Health, scientific assistant with the United States Public Health Service, and has been connected with the Sanitary Service of the Red Cross. During the war he was first lieutenant in the United States Army Sanitary Corps. In 1922 he was admitted to the Bar of Washington, D. C. As a result of his studies he has written many articles and books, be-

(Concluded on page 222)

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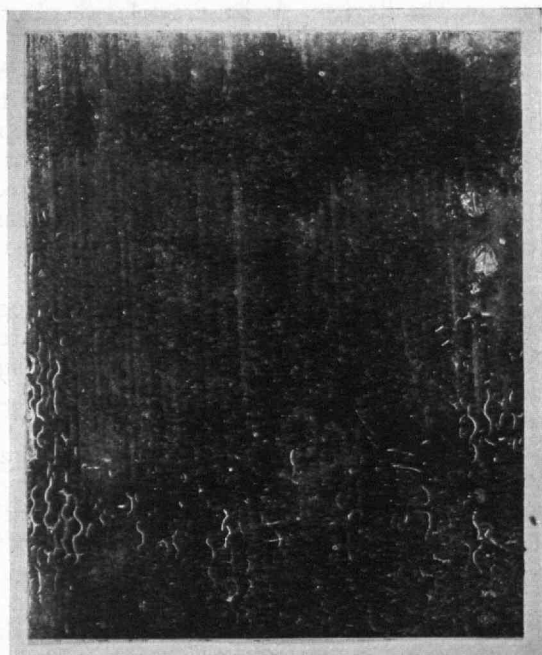


PLATE I — The deterioration, so apparent in the streaks, crazes, and dullness, is common in mirrors silvered by the usual process. Mirrors so affected may be found everywhere — in homes, on ships, institutions, and public building installations.

PLATE II  
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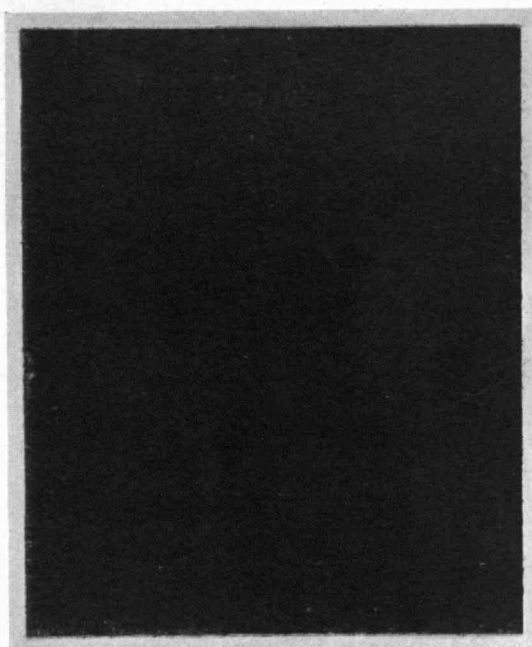


PLATE II — Shows, in comparison with Plate I, much better than word description can, the perfection and freedom from the usual deterioration which are guaranteed to you when you buy and install the BRASSCRAFTERS' "EVALAST" Mirrors and Medicine Cabinets.

*These illustrations were made from actual photographs (without retouching) of specimens of mirror plates which were submerged constantly in water for over eight months, except for occasional inspection, and demonstrate graphically the action of silver under atmospheric moisture when applied by the usual process and by the "EVALAST" Process.*

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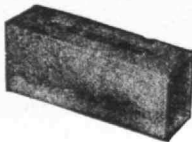


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## THE TABULAR VIEW

(Concluded from page 220)

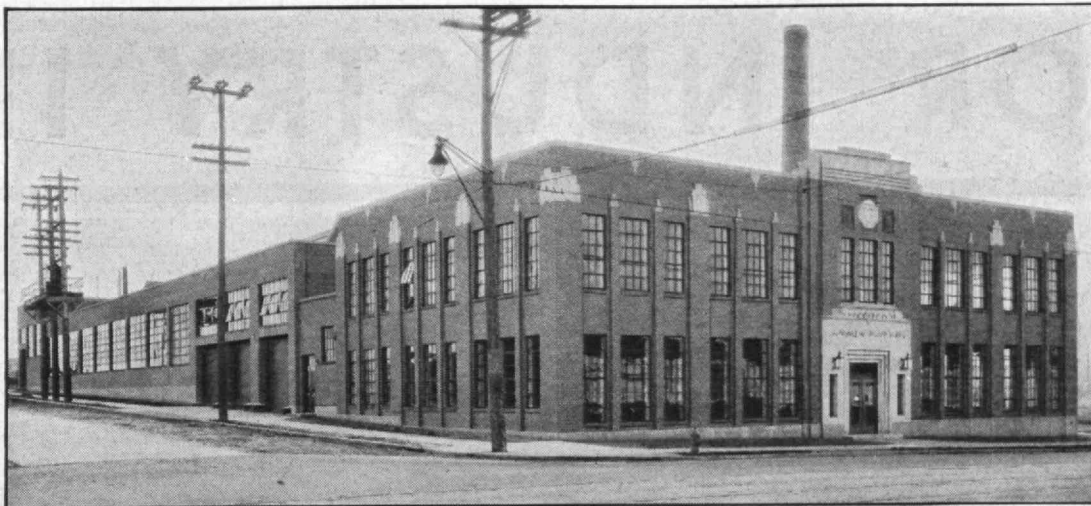
sides being Associate Editor of the American Journal of Public Health. In 1930 he became Director of Health Service of The Borden Company in New York.

TO HUXLEY has been attributed the remark that six monkeys set to pound unintelligently for millions of millions of years on typewriters would be bound in time to write all the books in the British Museum. The reverse operation of this law of probability unfortunately applies to the appearance of errors in magazines and books. To its unescapable operation (we would, of course, admit no other reason) may be attributed those errors which appear in The Review. As an example we point to the biographical note on Mr. Harold B. Warren in this column last December. Mr. Warren was never a Professor of Landscape Architecture at either the Institute or Harvard University, but instead he was for a good many years instructor in Drawing and Water Color in the Schools of Architecture and Landscape Architecture at Harvard University, from both of which positions he has just retired.

ON THE 126th birthday of William Barton Rogers, the founder of Technology, a tablet was dedicated to his memory. LAUREN B. HITCHCOCK describes these impressive exercises in this issue of The Review, giving an idea of Dr. Rogers' activities at the University of Virginia. Professor Hitchcock took the course in Chemical Engineering at the Institute, graduating in the Class of 1920, and in 1927 he obtained his master's degree. At the present time he is an Associate Professor in the school of Chemical Engineering at the University of Virginia.

THE water color reproduced on the cover of this issue was executed by CASS GILBERT, '80, in 1924. It pictures Marlton Church in England, the church of his ancestors. Mr. Gilbert has achieved world-wide distinction as an architect, being particularly well known as the designer of the Woolworth Building and as the architectural advisor on the new Hudson River Bridge and the Kill van Kull Bridge. He is a member and a director of the American Academy of Arts and Letters. In 1928 he was reelected President of the National Academy of Design.

REQUESTS come to us at intervals for editorial treatment of subjects dear to the hearts of Review readers. One reader, for example, requested a study of the wood pulp situation, a request to which we promptly conceded as indicated by the article on that subject in the December number. At the suggestion of another reader we looked into glass technology in America and "A Sermon on Glass" was the result. With editorial abandon we herewith publicly announce we shall be receptive to all suggestions sent us, providing they fall within the scope of The Review. We are also happy to receive any questions on science and engineering which derive from the reading of the magazine.



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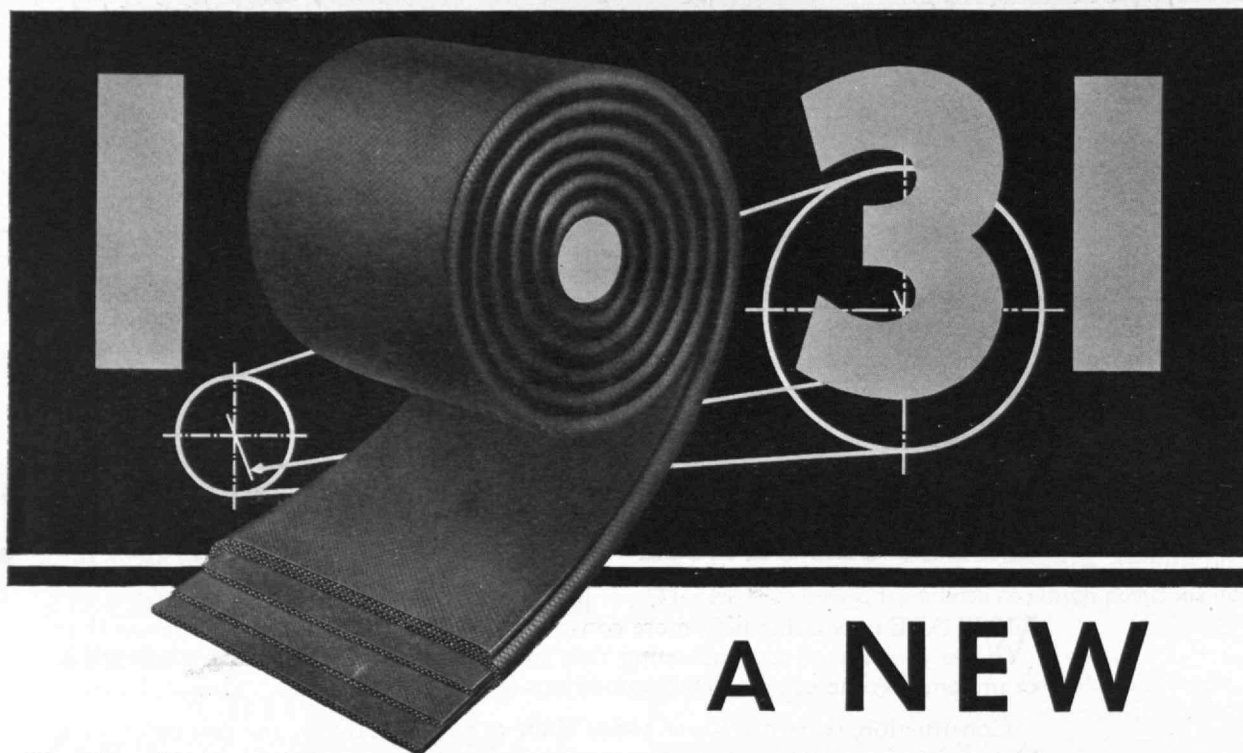
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# THE TECHNOLOGY REVIEW

*Edited at the Massachusetts Institute of Technology*

VOLUME XXXIII

NUMBER 5

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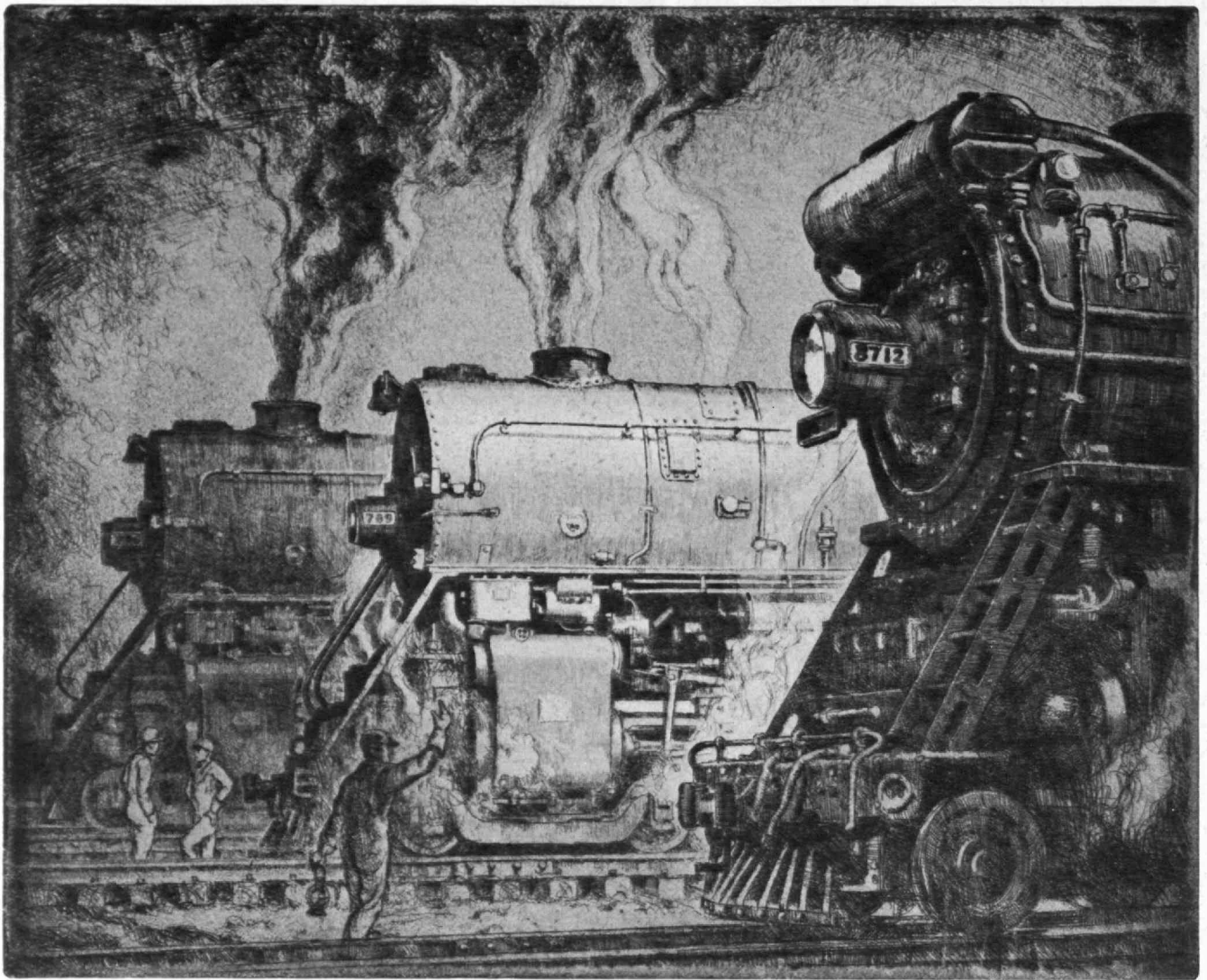
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Courtesy Goodspeed's Bookshop

## LADIES IN WAITING

*From an Etching by Otto Kubler*

SOMEONE has said that dinosaurs disappeared because the world became too clean for them. For the same reason — and others — the steam locomotive may suffer a similar fate, but its passing will be mourned by many. Edward Yeomans, writing in the November, 1930 *Atlantic Monthly*, is one of these and his lamentations should not pass unnoticed:

*"The steam locomotive is, when all is said that can be said for other devices, about the most dramatic expression of hand and mind coöperation. It is a magnificent piece of craftsmanship. It is the noblest of articulated tools. It fills the whole demand of the imagination as a thing to ride on across the country. A horse is a great and mysterious thing and Job did not overdraw the picture of him, his neck clothed with thunder, pawing in the valley, the glory of his nostrils terrible. But this beast . . . on its 4-6-2 chassis, weighing 360,000 pounds, this amazing simulacrum of life, breathing gently with its duplex air pumps, humming slightly at the safety valve, gleaming faintly on its polished sinews, a huge demonic figure condensed from the darkness, a djinni of the Arabian Nights . . . this beast, I say, is the most impressive symbol of the courage and craftsmanship of man since the clipper-ship era.*

*"And it will presently be gone — as the clipper ship went — and the expressionless electric and Diesel locomotives, efficient and cold, will change poetry into prose on the railroads of the country."*



# THE TECHNOLOGY REVIEW

VOLUME 33

FEBRUARY, 1931

NUMBER 5

## SCIENCE ENDANGERED

*Must It Follow the Classics to the Academic Graveyard?\**

BY NICHOLAS MURRAY BUTLER

IT IS hard to imagine anything more sad than the decline and fall of classical scholarship and classical teaching in American education, with the resultant paralysis in the development of our national understanding and our national cultivation. The changed conditions of life and of knowledge being what they are, it would have been quite impossible under any circumstances, as well as unwise, for the ancient classics to maintain their one-time dominance of the best type of secondary school and college education. An appropriate readjustment of their place in the educational program would, however, have been something very different from the substantially complete downfall which has overtaken them. The Greek language and literature, Greek history, Greek eloquence, Greek philosophy and Greek institutional life, a knowledge of all of which is a *sine qua non* to an understanding of the intellectual and the

spiritual life of today and to preparation for full participation in that life, have passed quite outside the range either of knowledge or of interest of the present generation of American students and their teachers. Latin, which bade fair to travel the same road, has been checked somewhat in its decline, but nevertheless its situation is parlous in the extreme.

The effects of all this are apparent on every hand. They reveal themselves in a lack of historical knowledge and perspective, in a lack of acquaintance with what is the very best and most fruitful of human experience, and in a lack of understanding of the significance of those literally colossal achievements of the mind and spirit which made ancient Greece and Rome immortal, no matter what fate may befall their history, their literature and their institutions as elements of an educational program. With all these have come also increasing carelessness of good manners and a sorry lowering of literary and artistic standards.



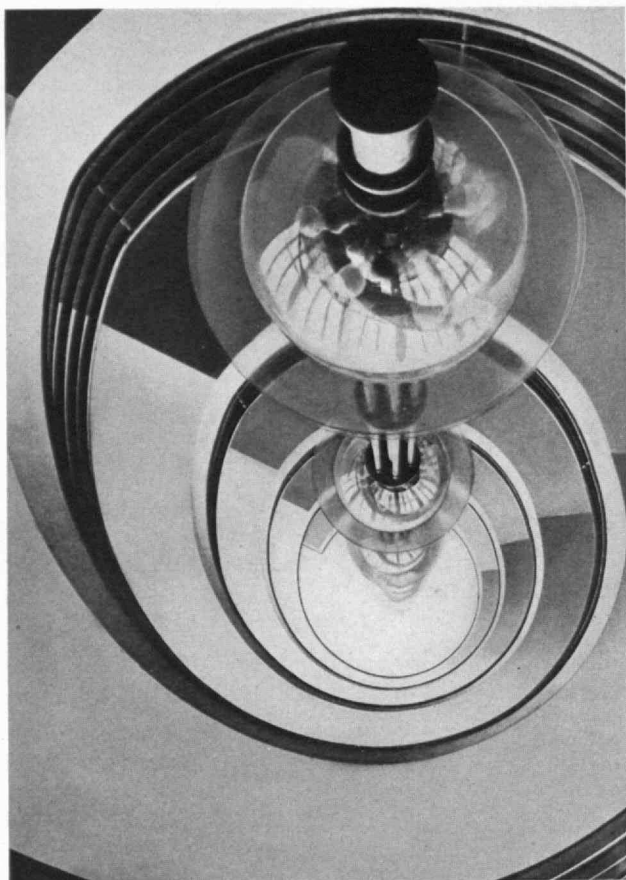
Galloway

INSCRIPTION IN MAIN HALL OF THE ACADEMY OF ARTS AND SCIENCES,  
WASHINGTON

Hearken to the miseries that beset mankind. They were witless erst and I made them to have sense and be endowed with reason. Though they had eyes to see they saw in vain. They had ears but heard not. But, like to shapes in dreams, throughout their length of days without purpose they wrought all things in confusion. . . . They had no sign either of winter or of flowery spring or of fruitful summer, whereon they could depend. But in everything they wrought without judgment, until such time as I taught them to discern the risings of the stars and their settings. Aye, and numbers, too, chiefest of sciences, I invented for them, and the combining of letters, creative mother of the muses' arts, wherewith to hold all things in memory. . . . 'Twas I and no one else that contrived the mariner's flaxen-winged car to roam the sea. . . . If ever man fell ill, there was no defence. But for lack of medicine they wasted away, until I showed them how to mix soothing remedies wherewith they now ward off all their disorders. . . . Hear the sum of the whole matter — every art possessed by man comes from Prometheus.

— Aeschylus: "Prometheus Bound"

\*From the Report of the President of Columbia University for 1930.



Acme

STAIRWELL IN THE NEW HEADQUARTERS OF THE UNION OF METAL WORKERS IN BERLIN

This decline and fall, it must be admitted, has been hastened and made certain by the attitude and influence of a host of those who were themselves teachers of the classics and who were engaged in the promotion of classical scholarship. They saw fit to supplant understanding of the ancient world with a myriad of minutiae of highly specialized learning, and to push far into the background the vitally important art of interpretation which is the essential element of real teaching.

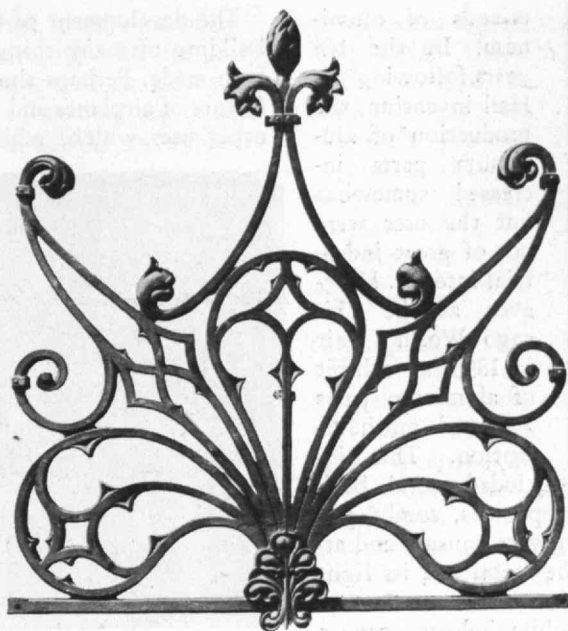
Following the remarkable series of discoveries which began something more than a hundred years ago and which absorbed the attention of classical scholars in Germany, in France, more or less in England, and increasingly in the United States, the classical teacher too often left off the useful task of exposition and interpretation and became a highly specialized research worker in some narrowly bounded field of philology, of epigraphy or of archaeology. Into academic recesses such as these naturally no considerable company of students could possibly follow. Classical studies became identified in the public mind with this sort of minute and highly technical knowledge, and they rapidly lost their commanding and inspiring position as the seat and center of the study of humane letters. So it came about that in time classical studies in the schools and colleges of the United States were first asphyxiated, then embalmed, then incinerated, and finally placed in well-decorated funeral urns in the academic columbarium by those who should have been their glad and eager companions, exponents and interpreters. Minute technical studies had been substituted for

literary and aesthetic appreciation and interpretation. When that happened the end was in sight. If there is ever again to be a genuine revival of classical learning — and nothing would more help and uplift American education and American life — it can only follow upon the influence of a group of scholars who are inspired by the ideals at which Greek and Roman art and letters aimed, and who are endowed with a capacity to interpret these in terms to be understood in the light of the world of today. Now and again there is a flash of lightning against this darkly clouded sky that comes from the direction of Oxford or Cambridge or Scotland or France or Italy, but it must be confessed that these moments of illumination are few and far between.

STRANGE as it may seem, the academic subjects whose rise contributed powerfully to pushing the ancient classics into the background appear now to be themselves in danger of coming under the influence of forces wholly similar to those which have destroyed the prestige of the ancient classics and any considerable knowledge of them. The natural and experimental sciences are of fascinating interest to every one who aspires to regard himself as an educated man. For some 400 years the subject matter of these sciences has been steadily and rapidly expanding and as scientific method has increased its power of penetration and multiplied its capacities the world about us has yielded one amazing secret after another until today the limits of scientific knowledge are measured only by the distance from the incredibly vast to the inconceivably small. Earlier and apparently well-established divisions of scientific territory are steadily disappearing. No one can longer tell where physics ends and chemistry begins, and now biophysics has come into existence to burrow through the wall which has separated physics from biology. Mathematics, the earliest tool and instrument of abstract thought, then long regarded as little more than a curious method of playing with the symbolic and the unreal, has reasserted itself at the hands of Einstein as the clue to the structure and fundamental laws of the physical universe. The whole round world has become the playground of the mind. Hypothesis quickly leaps into demonstration and demonstration then with lightning-like rapidity becomes the foundation of new and strange superstructures. To be ignorant of all this, or to be careless of it, is to put oneself outside the pale of that kind and wealth of understanding which are essential to liberal education.

Nevertheless, there are not wanting signs that teachers and research workers in the field of natural and experimental science may yet do for their favorite knowledges precisely what the teachers of the ancient classics have done for an understanding of the life and literature of ancient Greece and Rome. Today if the university student wishes to make himself a specialist in any one of the various fields in which science presents itself to him, the largest ability, the widest knowledge and the most splendid laboratory equipment are at his service. He may quickly be drawn and pushed into the secret places of physics, of chemistry, of biology, of geology, of astronomy or even of mathematics; but how fares it with him who, not wishing to become a specialist in any of these fields, seeks for accurate and (Continued on page 250)

TO THE RIGHT: A STUDY IN  
DETAIL OF AN ALUMINUM  
PANEL FOR THE CRESTING  
ON THE ROOF OF THE  
GERMAN EVANGELICAL  
CHURCH, PITTSBURGH



BELOW: SECTION OF A HAND-  
WROUGHT ALUMINUM  
RADIATOR GRILLE IN A  
PRIVATE RESIDENCE. OTHER  
SECTIONS ARE SHOWN ON  
THE FOLLOWING PAGES

# EVOLUTION OF A BABY RATTLE

*Being an Account of Aluminum's Rise in 100 Years from  
Obscurity To a Metal of All Work*

BY ROBERT S. WILLIAMS

IN 1856 the Prince Imperial of France was one year old, and with that touch of nature which makes the whole world kin, including royal babies, he required a rattle. His desire being a common one, it was fitting that its fulfillment take an uncommon form. A gold or a silver rattle would have been costly, but not uncommon, so the royal attendants searched for another material. Happily, there was a new metal that had first been made in 1827, that cost \$300.00 a pound, and that was very rare — a fitting material from which to make a royal rattle. This metal was aluminum, and its use for the Prince's rattle constituted the first known commercial use of that metal.

If the Prince had been born today he would, no doubt, have scorned an aluminum rattle, for the metal has, of course, become very commonplace and its price 23¢ a pound. Instead of its being devoted exclusively to the manufacture of rattles, the royal attendants would find it used for manufacturing great structural beams 90 feet long and more than one foot thick. They would find it used for airplane parts, railroad coaches, and probably a majority of their food would be cooked in

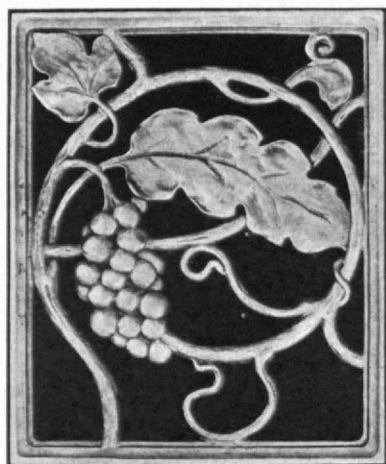
kitchen utensils made of it. They would find gleaming aluminum spires on buildings, and even buildings supported by aluminum frame work. In short, they would discover that metallurgists had taken a rare substance and developed it into one of the most useful and versatile modern metals.

The first authentic use of aluminum in America is recorded in the manufacture of a surveyor's transit in 1876. This instrument was in constant use until 1909 when it was taken back by the original manufacturers and is now in their museum. In 1884 a small pyramid of aluminum six inches at the base, about ten inches high, and weighing 100 ounces, was cast to form the cap of the Washington Monument. It has been subjected to constant weathering for more than 45 years and still reflects the sun from its exposed surfaces.

In 1889 a young student, Charles M. Hall, announced his invention of the modern electrolytic method of producing aluminum and, as a result, the price dropped rapidly. At that time Hall offered to sell it for \$2.00 a pound in 1,000-pound lots but was unable to interest anyone as no one wanted 1,000







pounds of aluminum. In the ten years following the Hall invention, the production of aluminum parts increased somewhat but the uses were not of great industrial interest. However, at the Chicago World's Fair in 1893, an exhibit of aluminum parts attracted much attention. This included metal back

brushes, collar buttons, salt and pepper sets, combs, pen holders, and similar articles which were unusual and attractive because of the color of the metal and its light weight.

The development of the automobile industry gave a great impetus to the development of aluminum alloys and there was a constant improvement in the properties of these metals in the cast condition. In 1911 an epoch-making publication by Wilm in Germany announced the production of a new alloy which made possible the airship of the zeppelin type, all metal airplane and many other machines that could not have been made without a light, strong metal. This alloy was named duralumin or, as it is coming to be called in modern parlance, dural. As originally made, it contained approximately 96% aluminum, 3.5% copper, and 0.5% of magnesium. While slight changes in composition have been made since that time, the original dural is still very widely used for many purposes.

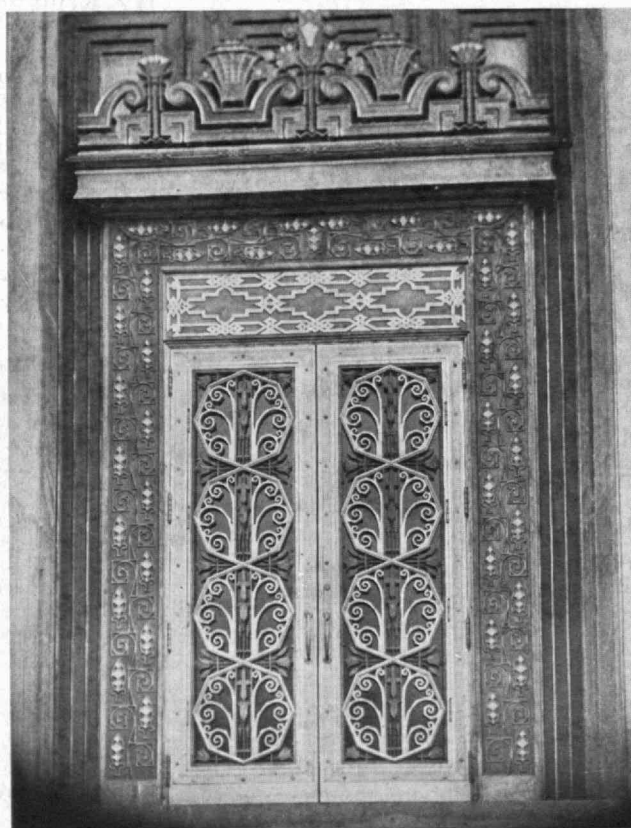
The most remarkable property of this new alloy was due to the fact that its strength and ductility were both increased to a great extent by its method of manufacture and heat treatment. Up to the time of Wilm's discovery, aluminum alloys had been used for the most part in the cast condition with tensile strengths of 20,000 to 30,000 pounds per square inch although its ductility values were low. In the production of duralumin the metal is first cast in the usual way, then heated to about 300° C., after which it is soft enough so that it can be rolled into sheets or various structural shapes, into the small ribs used in airship construction, and into large structural beams now being produced by the Aluminum Company of America at their Massena, N. Y., plant. After the metal has been formed at this temperature, it is heated to about 500° C. and suddenly cooled by dropping it in water, oil, or some other cooling medium. Immediately following this quenching operation, the duralumin has a tensile strength of about 33,000 pounds per square inch, but within a few minutes after its removal from the quenching tank it is found that the tensile strength has increased and it continues to increase over a period of hours or sometimes days until it finally increases in strength to about 65,000 pounds per square inch with an elongation of roughly 17%. In this new alloy, then, we have a metal as strong as the steel used in making steam boilers and as light as pine.

The development of this alloy has made possible the building of many things that formerly could not have been made. Perhaps the outstanding use is in the manufacture of airplanes and airships although there are many other uses which, while less spectacular, are of equal



APPEARANCE OF CAST ALUMINUM SPANDREL WHEN TAKEN FROM THE SAND BEFORE CHASING AND FINISHING

importance. Street cars, automobile bodies, and automobile parts have been made of it. Its use is being considered now for the building of railway coaches, particularly by the Pullman Company as the great decrease in weight will be of immense value in the operation of the very heavy trains. An all-aluminum railroad tank car, of riveted construction, has been built for the transporta-



DEPLETED AND HI-LIGHT ALUMINUM CASTINGS MAKE UP THIS EFFECTIVE ENTRANCE TO THE NEW KENSINGTON RESEARCH LABORATORY OF THE ALUMINUM COMPANY OF AMERICA

tion of acetic acid. It is being tried in an experimental way in the manufacture of connecting rods for large locomotives. The decrease in weight will cut down the pounding action of a heavy steel connecting rod to such an extent that locomotive operation will undoubtedly



ILLUSTRATIONS APPEARING IN THIS ARTICLE ARE BY COURTESY OF THE ALUMINUM COMPANY OF AMERICA

be increased possibly 15 or 20% with no more wear on the rails.

One of the most recent developments in the use of duralumin has come as a result of the development of the new material alclad. This is made by coating duralumin with aluminum of extremely high purity. The pure metal serves to protect the duralumin beneath it from corrosion

to a marked degree. The alclad sheets have been made so thin and light that they have been used to replace the fabric in the lighter-than-air ships of the zeppelin type. Alclad was used to cover the Navy's ship ZMC-2 and may be used in place of fabric in the building of the large airships at the Goodyear plant.

The possible uses of alloys of aluminum in the future are innumerable and work is being carried out actively in many laboratories looking toward the development of new and better alloys for various purposes.

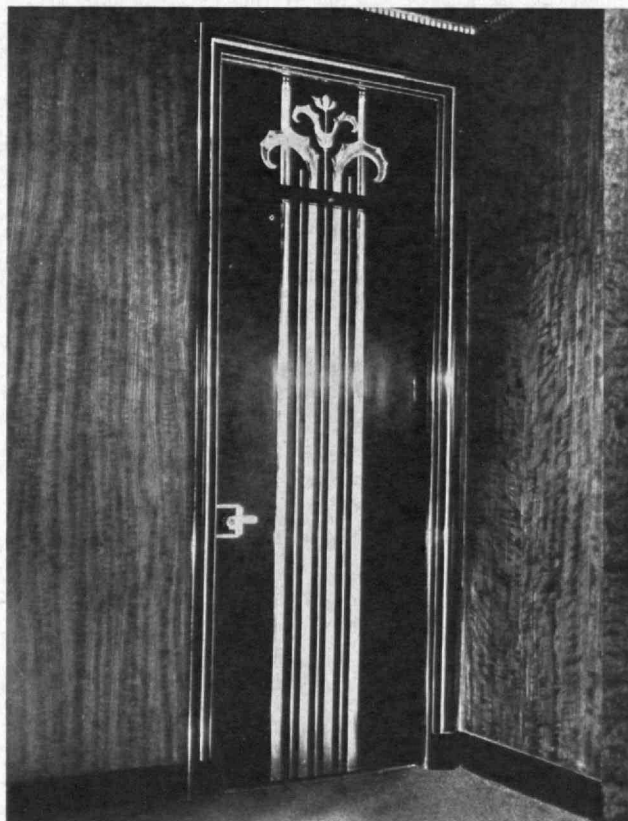
The use of aluminum as an architectural material is almost unlimited. Since it can be fabricated in much the same way that other metals are, and in many instances much more easily, and since it is not affected by ordinary atmospheric gases, and is corrosion-resistant, it is rapidly becoming one of the architects' most important and useful materials. When aluminum oxidizes it turns to a pure white powder which serves as a protective covering. There is nothing in it that will stain stone work of other materials.

So far, aluminum has been used mainly for spandrels. Since its weight is approximately one-third of that of other metals it is much easier to handle, and its cost of installation is less. Over 900 aluminum spandrels were used on the Koppers Building in Pittsburgh and it is estimated by the owners of this building that the erecting cost of these aluminum spandrels was 40% less than the cost of cast iron spandrels. Structural shapes of it are being used to a limited extent to replace steel beams and girders in tall buildings, especially in the towers.

It has also been demonstrated that it would be very excellent material for roofing, for terrazzo strips, window sills, elevator doors, and for ornamental metal work.

Because of its heat transmitting quality, it makes a suitable material for radiators. Its imperviousness to moisture makes it an excellent material to use for mop strips in bathrooms, and in experimental form for water pipes. Enamel aluminum has been used exteriorly on the new research laboratory building of the Aluminum Company of America. It has been found that it can be dyed also, making it possible to finish the metal in various colors suitable for either exterior or interior use. Dyed aluminum is now on the market.

The multiplicity of uses to which aluminum and its alloys are being adopted attests to the ingenuity of the metallurgist, and to his growing mastery of metals. In past issues The Review has spoken of other great developments that have poured out of the metallurgical laboratories in rich profusion: carbonyl, the austenitic steels, methods for making rare metals available cheaply. The story of aluminum is an earnest of what the future holds.



ALUMINUM TUBING AND EXTRUDED SHAPES GIVE A DISTINCTIVE AND MODERNISTIC APPEARANCE TO THE NEW YORK SALES OFFICE OF THE ALUMINUM COMPANY OF AMERICA





THE CHALLENGERS

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# INVENTION AND ECONOMICS

## *Some Social Implications of Technical Research*

BY B. ALDEN THRESHER

THE dividing line between invention and "improved practice" is a notoriously elusive one. For convenience, the term innovation may be used to cover both, and so to include all those changes in the practical arts and technique of physical production which abridge and lighten labor, and give rise to new products. The dominating importance of such innovation in the present age is a matter of common notoriety, and it is not necessary here to indulge in platitudes concerning it. Moreover, because the entire economic and social system under which we live is so profoundly affected by this phenomenon, it is a matter of some interest to trace a few of the ways in which economists and social philosophers have regarded it, and endeavored to fit it into their generalizations regarding the economic system and, indeed, the whole structure of society.

Writing in 1691, Sir William Petty, that pioneer statistician and economist of the seventeenth century who combined the practical wisdom of the man of affairs with no small degree of philosophic insight, put his finger upon the very nub of the twentieth century problem of research as a factor in the economic world. What are its collateral effects on society likely to be? How can its

economic worth be evaluated? How are the resulting benefits likely to be distributed among the innovators themselves, their employers, the various classes of the consuming public, and posterity? The answers to questions such as these depend upon an economic analysis of the functions and significance of innovation.

"We must make," said Petty, "a Par and Equation between Art and Simple Labour; for if, by such Simple Labour, I could dig and prepare for Seed a hundred acres in a thousand days, suppose then I spend a hundred days in studying a more compendious way, and in contriving tools for the same purpose; but in all that hundred days dig nothing, but in the remaining 900 days I dig 200 acres of ground; then I say that the said Art which cost but 100 days' Invention is worth one man's labour forever; because the new Art and one Man performed as much as two men could have done without it."

That intangible element which Petty calls Art is the pearl of great price which big business is now seeking. Simple labour is a drug on the market. When something is available which is worth one man's labor forever, it is not surprising that it should be assiduously sought after. Here are two instances, taken at random, which



show that the search has not gone unrewarded: a recent press release states that as a result of the work of the Bell Telephone Laboratories "on eight selected items there resulted an estimated saving in first cost for the Bell System of \$1,000,000,000 from the year of development to the end of 1929." Or, again, according to the National Electric Light Association, electric light now costs less than 5% of what it did in 1880, due to (1) reduction in rates for current, (2) improvements in the efficiency of lamps, (3) reduction in the prices of lamps. There is bitter controversy regarding the extent to which these improvements have been and should be passed on to the consumer, and how far the large industrial user of power may justifiably be favored at the expense of the small domestic consumer. In the heat of the legal controversy over rates and valuation, with its necessary emphasis on plant investment, and other tangible capital goods, it is easy to lose sight of the intangible elements of knowledge and technique which underlie the whole question, and which are more fundamental in their long-run effects upon society.

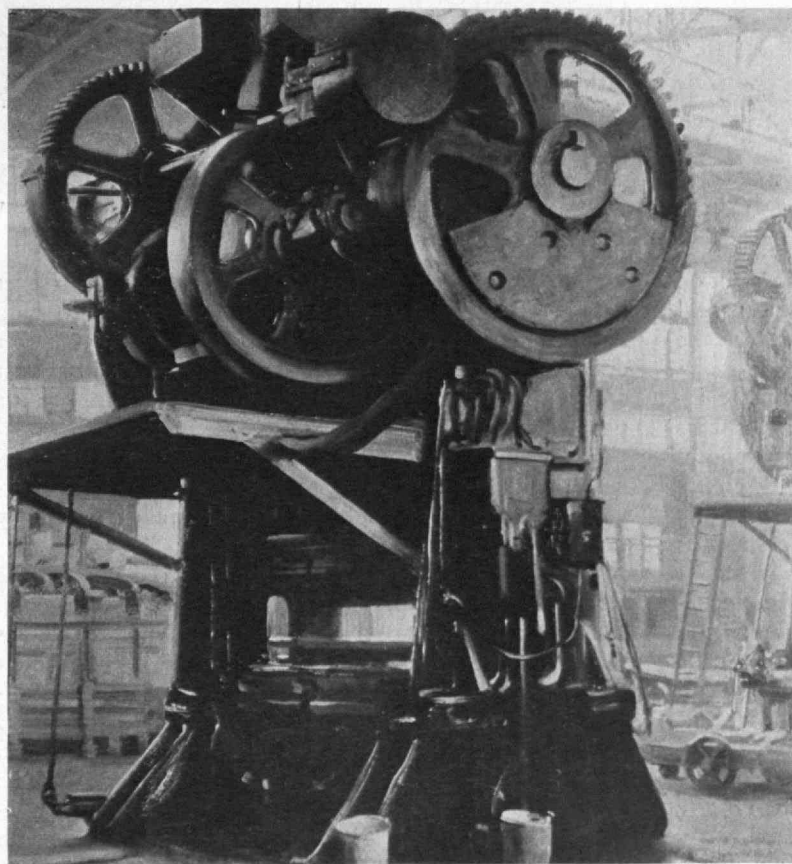
But I am concerned here neither with the public utility question as such, nor with illustrative instances of the practical results of technical innovation. Instances such as have just been cited are commonplace and well known to every informed reader. My concern, for the moment, is with the underlying theoretical analysis of innovation and the ways in which changes in technique are, so to speak, geared into the going economic system. In the main it appears that the progress of innovation serves

as a prime mover which in turn sets up profound economic and social change through various kinds of economic nexus. There is also a reverse action by which the needs of society in turn react upon the course of research and invention, influencing their scope and direction. It is this latter phenomenon which has given rise to the somewhat questionable proverb that "necessity is the mother of invention," to which the pertinent proviso has been added that necessity is sometimes unconscionably delayed in bringing forth her children.

The average educated man who has given no special thought to the economics of invention is likely to harbor what the psychologists call stereotype ideas regarding it. The first of these is the Industrial-Revolution stereotype. This set of ideas is commonly the result of a college course in the elements of economics, in the incipient stages of which something was said about the Industrial Revolution. This event is regarded as one of those old, unhappy, far-off things from which attention would, happily, be soon diverted to consider more timely matters. A prominent place in this stereotype is occupied by the great inventions in textiles, steam power, metallurgy and machine tools by Watt, Arkwright, Whitney, Stephenson and the rest. This sudden outburst or saltation of the inventive faculty is conceived to have given rise to the factory system with its attendant increase of physical output, and with all the crying evils which, under the *laissez-faire* scheme of things, it brought in its train.

Then there is the Sunday-Supplement or romance-of-engineering stereotype. Fed by the lurid word-painting of some writers on popular science, the unwary reader is led to believe that the confraternity of scientists and engineers can work miracles continuously and indefinitely upon demand; that the world is likely to be revolutionized over night in consequence; and that this body of wonder workers are not as other men, but dwell in a world apart, among mysteries not accessible to the vulgar. In this picturesque viewpoint the spectacular and the striking are ever to the fore, making it difficult to form any balanced idea of the real nature of the rôle of science in technical innovation.

There is obviously some truth in both these stereotypes of the popular mind. The Industrial Revolution unquestionably started something. In the first place, it is not to be regarded as a dead-and-gone event, of no more significance in current affairs than, say, the history of bi-metallism. On the one hand, as recent researches of the economic historians have shown, its roots lie centuries back, in a long series of gradual technical discoveries and improvements which, for reasons even now not wholly clear, blossomed out and came suddenly to fruit in the particular conjuncture of circumstances which existed in England 150 years ago. The heroic theory of invention has long been discredited. The instinct of contrivance is known to be widely distributed among all kinds of men and the process of innovation



Gerrit A. Bencker

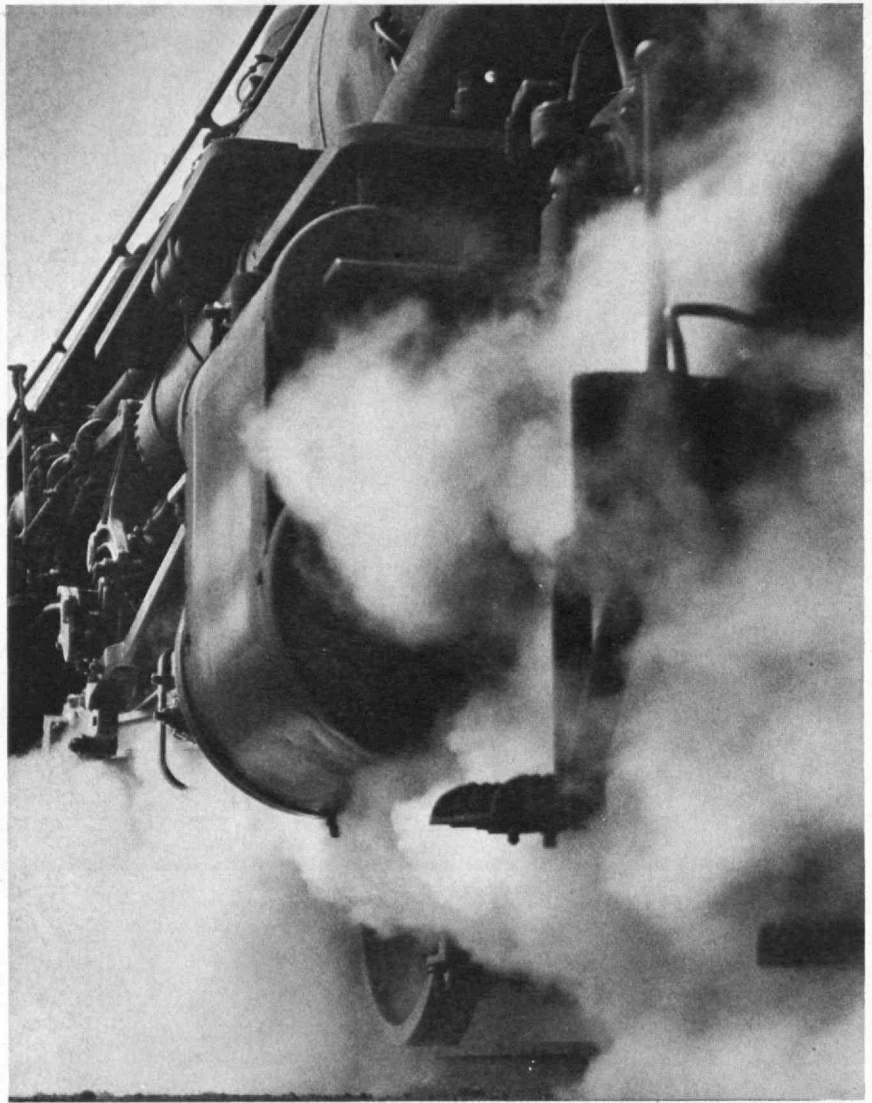
"GRAY MATTER" ("THE IRON MAN"), PAINTED IN THE MILLS OF THE HYDRAULIC STEEL CO., CLEVELAND, OHIO

to be an almost continuous one, carried on now by taking the next and most obvious step and again by intervals of synthesis in which isolated improvements and technical elements are combined to form a significant new development. On the other hand, the Industrial Revolution is seen to be not merely a past event, but only an early manifestation of a series of forces which are even now still growing in intensity. It is a movement in the midst of which we find ourselves, and we are still at many points baffled in our attempt to deal collectively with it.

So it is with the other stereotype. There is unquestionably much in the latterday progress of applied science to touch the imagination, but to allow this emotional stimulus to work itself out solely along romantic lines is to miss its real significance. The work of scientific and industrial innovators is too commanding in its effects to be merely set up as a nine-days' wonder, to be gaped at in uncritical astonishment. Its repercussions upon the structure of society are too vital for human welfare to justify this easy course. It becomes, therefore, a major task of the social scientist to find out what is really happening and what the results are likely to be. The abstract laboratory problem of today becomes a social and economic problem tomorrow, with much attendant tumult and shouting. The economist has a peculiar interest in the problem, because it is through the working out of economic influences, in the first instance, that technical innovation carries out its effect on society. The economist has far to go before he can deal with his aspect of the problem with anything like the assurance that the physical scientist exhibits.

Current affairs are affected at every turn by the influence of innovation. In technological unemployment its weight falls on the working man. In the various phases of plant obsolescence, capital feels its blows, which are often sudden and not easily foreseen. A collateral subject which has been arousing the interest of technical men is the question of what share the innovator shall have in the profits accruing, as against the corporation which employs him. There is the vexed question of discrimination among different classes of consumers, as in the electric power industry. There are the more obvious changes in consumption and habits of living which innovations bring about; and as a manifestation of the growing pressure of innovation in the business world, there is the growth of institutions such as Technology, so closely articulated with the innovative work of industry.

Now the striking feature of the art which Sir William Petty supposed to result in a "more compendious way" of doing a given job is the marked disproportion, or perhaps



DISPATCH

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we may say the lack of any definite relation whatever between the human effort that goes into the contriving and the importance and value of the results. A clever dodge, hit upon in a moment of reflection, may have vast consequences in lightening labor or in adding to its physical product; or, again, years of effort may be expended, only to come to naught. It is a chanceful business at best, even under present-day conditions of organized research, where every effort is made consciously to guide the path of development.

Here arises the first obstacle in trying to deal with the fact of innovation under traditional economic categories. The work of the innovator is obviously labor, since it is the product of human effort. Yet it is equally obvious that by no stretch of the imagination can such work be evaluated on any basis of labor-hours, or quantity of labor, as Ricardo and later the socialists would have expressed it. Sometimes the desired results come about as planned; sometimes they do not. Often wholly unexpected consequences occur, either directly as the result of research or collaterally, in industries apparently remote from the field under investigation. Nineteenth century economists, seeing that labor was of (Continued on page 250)

# THE FASTEST TRAINS

## *American Train Speeds Compared with European*

BY HAROLD E. LOBDELL

NEWS of the shattering of a speed record, whether by airplane, over the rails, in a racing auto or motor boat, by rocket car or parachute, or other means seldom fails to excite curiosity, admiration, awe, or debate. Sometimes it excites all if the new triumph seems to presage a mode which an ordinary mortal may expect to find himself using ten or a dozen years hence.

But of greater immediate concern to most of us is the commonplace increase of ordinary, everyday speeds at which existing common carriers are moving passengers. That, on a certain one day in June, 1927, a special train carried Lindbergh films from Washington to New York at 72 miles per hour, is not of such moment as the fact that anybody can be transported either way between these two cities any day in the year on the *Congressional Limited* at a 50 mile-per-hour average including stops. Again, by a combination of two special trains in March, 1924, the wife of a railroad president made a record by traveling from Los Angeles to New York in 69 hours and 7 minutes. This record still stands but today by regular daily services (Santa Fe's *Chief* and New York Central's *Fast Mail*) it only takes 8 hours 3 minutes longer despite 21 intermediate passenger stops and over an hour's delay for connections at Chicago.

Crack railroad trains were preëminently the swiftest regular means of travel over land until the advent of scheduled airplane services. For years, a "mile-a-minute" connoted the acme of speed for ordinary travelers. Now, of course, in a plane one or more times a "mile-a-minute" is customary.

But congenital prejudices, a desire for comfort in travel, an apprehension of un auspicious weather conditions and attendant uncertainty as to the maintenance of schedules, contribute to the problems of airline operators. For these and other reasons, despite the prevalence of air travel in Europe, despite its remarkable growth here in the past few years aided by mail contracts, cut rates and fostering by some of the railroad companies, rapid transit between large cities still implies a train to the average American.

That airplanes land on the outskirts of a metropolis while railroad terminals are almost always located well in town, is a point that weighs heavily. This is but another way of stating that sustained speed between cities, figured without deduction of time for intermediate stoppages, is what counts. Hence the *shortening* of everyday times by rail in the United States and Canada in the last decade is noteworthy, particularly since they *increased* during the preceding decade except for longer runs of over 2,000 miles. The times for these latter have picked up steadily since 1910.

To illustrate the trend in some detail The Review has compiled the table shown on the succeeding two pages. It gives the times, distances and average maintained speeds of trains on 30 representative fast American and Canadian runs, aggregating a total mileage of over

30,000. It will be observed that the runs included range from the 226-mile New York-Washington service to the 2,886-mile trek from Montreal to Vancouver. They divide into groups according to their mileage: a third vary between 200 and 475, about a third between 475 and 1,000, 5 are between 1,000 and 1,200, and 7 are over 2,000.

A summation of the hours and mileages of the speediest trains on each of the 30 individual runs in 1930 indicates a combined average of 40.9 miles per hour. For 1920 the corresponding figure was 34.0, for 1910 it was 34.6. Similar computations for the subdivisions mentioned above show strikingly the decline in average maintained speeds between 1910 and 1920 (except for the longest distances) and the subsequent rise between 1920 and 1930:

Group	No. of		
	runs	1930	1920 1910
200-475 miles.....	10	47.2	40.5 42.3
475-1,000.....	9	41.8	35.5 36.5
1,000-1,200.....	5	45.2	39.8 43.6
Over 2,000.....	6	37.8	30.5 29.9

A study of the table on pages 236 and 237 will suggest the question of how the increases have been effected. The answer does not lie entirely in the reduction of the number of intermediate passenger stops for they remain materially unchanged for 1930 as compared with 1920 on well over half of the runs. Better roadbeds and motive power, heavier rails, curve and grade elimination, and fewer operating stops to take on water and fuel are contributing factors. In some cases a special feature such as Hell Gate Bridge which, with tunnels under Manhattan, displaced a train ferry, has had a marked influence. On the western roads a tunnel under a mountain range has often worked wonders. The Cascade of the Great Northern, for example, besides shortening the line 9 miles, lowered the summit over 500 feet, eliminated curvature equivalent to 10 complete circles and did away with 18 miles of maximum grade.

Inevitably a discussion of train speeds on this side of the Atlantic prompts a comparison with European services. A Great Western train covers the 77.3 miles between London and Swindon in 70 minutes. It is acknowledged to be the fastest British train for a comparatively short run and another which approaches its speed is one on the London and North Eastern between Darlington and York. Its run is 44.1 miles and the time 43 minutes. Neither of these trains makes an intermediate stop. With these two trains the times of the expresses between Camden and Atlantic City compare not unfavorably. The Reading connects these points with a line 55.5 miles long and the Pennsylvania with one of 59.7. The times of their fastest trains are 55 and 58 minutes, respectively.

On a number of longer European runs excellent swift service is maintained without intermediate stoppage between terminals. Some of the (*Continued on page 260*)



# TABLE OF REPRESENTATIVE FAST RAILROAD RUNS BETWEEN METROPOLITAN CENTERS IN THE UNITED STATES AND CANADA

(Figures after names of trains indicate hours, mileage, and average speed, respectively. Example: Pennsylvania's *Congressional Limited*'s present schedule from New York to Washington in 4.5 hours over a distance of 226 miles is at an average of 50.2 miles per hour.)

Number of Run	Terminals of Run	Railroad	1930		1920		1910		Number of Run
1	New York-Washington	Pennsylvania	<i>Congressional Ltd.</i>	4.5 - 226-50.2	<i>Congressional Ltd.</i>	5.1 - 226-44.4	<i>Congressional Ltd.</i>	5.0 - 226-45.2	1
2	Boston-New York	N. Y. N. H. & H.	<i>Yankee Clipper</i>	4.75- 229-48.2	<i>Merchants Ltd.</i>	5.2 - 229-44.1	<i>Merchants Ltd.</i>	5.0 - 233-46.6	2
3	Chicago-St. Louis	Illinois Central	<i>Michigan Boulevard</i> <sup>1</sup>	6.5 - 294-45.3	<i>Daylight Special</i>	8.0 - 294-36.8	<i>Daylight Special</i>	8.0 - 293-36.7	3
		Chi. & E. Illinois	<i>La Salle</i>	6.5 - 290-44.6	<i>Chi.-St. Louis Ltd.</i>	7.8 - 290-37.2	<i>St. Louis Ltd.</i>	8.0 - 290-36.3	
		Wabash	<i>Banner Blue Ltd.</i>	6.5 - 286-44.0	<i>Banner Ltd.</i>	7.8 - 286-36.7	<i>Banner Ltd.</i>	8.0 - 286-35.8	
		Chi. & Alton	<i>Alton Ltd.</i>	6.5 - 284-43.7	<i>Alton Ltd.</i>	7.75- 284-36.7	<i>Alton Ltd.</i>	8.0 - 284-35.5	
4	Toronto-Montreal	Canadian National <sup>2</sup>	<i>Inter-City Ltd.</i> <sup>3</sup>	6.0 - 334-55.6	<i>International Ltd.</i>	7.7 - 334-43.4	<i>International Ltd.</i>	7.5 - 334-44.5	4
5	Chicago-St. Paul	C. B. & Q.	<i>North Coast Ltd.</i>	9.8 - 431-44.0	<i>North Coast Ltd.</i>	12.9 - 431-33.4	<i>Oriental Ltd.</i>	12.3 - 431-35.0	5
		Chi. & N. W.	<i>Victory</i>	9.8 - 396-40.4	<i>North American</i>	12.8 - 411-32.1	<i>St. Paul and Minneapolis Exp.</i>	10.8 - 412-38.2	
		C. M. St. P. & P. <sup>4</sup>	<i>Olympian</i>	9.8 - 410-41.8	<i>Olympian</i>	12.4 - 410-33.1	<i>St. Paul-Minneapolis Spec.</i>	11.7 - 410-35.0	
6	New York-Buffalo	New York Central	<i>Empire State Exp.</i>	8.5 - 436-51.3	<i>Empire State Exp.</i>	9.0 - 439-48.8	<i>Empire State Exp.</i>	8.75- 443-50.6	6
7	New York-Pittsburg	Pennsylvania	<i>Spirit of St. Louis</i>	9.4 - 440-46.8	<i>Broadway Ltd.</i>	9.6 - 441-45.9	<i>Pennsylvania Spec.</i>	8.75- 439-50.2	7
8	Boston-Washington	N. Y. N. H. & H., Pennsylvania	<i>Senator</i>	9.5 - 458-48.2	<i>Colonial Exp.</i>	11.75- 458-38.1	<i>Colonial Exp.</i>	12.7 - 444-35.7	8
9	Chicago-Pittsburgh	Pennsylvania	<i>Liberty Ltd.</i>	* 9.7 - 468-48.3	<i>Broadway Ltd.</i>	10.3 - 468-45.5	<i>Pennsylvania Spec.</i>	9.1 - 468-51.4	9
10	San Francisco-Los Angeles	Southern Pacific	<i>Daylight</i>	11.75- 471-40.1	<i>Lark</i>	14.25- 475-33.3	<i>Shore Line Ltd.</i>	13.5 - 475-35.2	10
11	Cincinnati-Atlanta	Southern Louisville & Nashville	<i>Royal Palm Southland</i>	12.8 - 491-38.3 12.8 - 488-38.1	<i>Royal Palm Southland</i>	17.25- 493-28.6 15.0 - 488-32.5	<i>Florida Spec. Number 33</i>	15.0 - 494-32.9 14.0 - 487-34.8	11
12	Washington-Atlanta	Southern	<i>Crescent Ltd.</i>	16.25- 638-39.3	N. Y. & New Orleans Ltd.	20.5 - 649-31.6	N. Y. & New Orleans Ltd.	19.25- 649-33.7	12
13	Portland-San Francisco	Southern Pacific	<i>Cascade</i>	21.2 - 721-34.0	<i>Oregonian</i>	32.8 - 745-22.7	<i>Shasta Ltd.</i>	27.5 - 745-27.1	13
14	St. Louis-Dallas	Mo.-Kan.-Texas Missouri Pacific	<i>Texas Spec. Sunshine Spec.</i>	17.9 - 767-42.8 17.9 - 711-39.7	<i>Texas Spec. Sunshine Spec.</i>	19.25- 767-39.8 19.1 - 707-36.3	<i>Katy Ltd. Number 3</i>	23.2 - 767-33.1 23.0 - 708-30.8	14
		St. Louis-San Francisco	<i>Texas Spec.</i>	17.8 - 688-38.6	<i>Texas Spec.</i>	19.25- 688-35.7	<i>Number 6</i>	22.6 - 684-30.3	
15	Washington-Chicago	Pennsylvania B. & O.	<i>Liberty Ltd. Capitol Ltd.</i>	18.75- 836-44.6 18.75- 786-41.9	<i>Broadway Ltd. N. Y.-Chicago Ltd.</i>	19.75- 837-42.3 20.7 - 779-37.7	<i>Pennsylvania Spec. Chicago Ltd.</i>	18.25- 837-45.8 21.3 - 820-38.5	15
16	Montreal-Chicago	Canadian National <sup>2</sup>	<i>International Ltd.</i>	18.25- 848-46.5	<i>International Ltd.</i>	23.3 - 841-36.1	<i>International Ltd.</i>	23.7 - 842-35.5	16

17	Cincinnati-New Orleans	Louisville & Nashville Southern <sup>5</sup>	Pan-American Queen and Crescent Ltd.	23.75-921-38.8	New Orleans Ltd.	28.2-923-32.7	Number 1	26.5-923-34.8	17
				23.4-836-35.7	New Orleans Ltd.	27.8-837-30.2			
18	Chicago-New Orleans	Illinois Central	Panama Ltd.	21.0-921-43.8	Panama Ltd.	22.75-921-40.5	New Orleans Spec.	25.25-921-36.5	18
19	New York-Chicago	New York Central Pennsylvania	20th Century Ltd. Broadway Ltd.	20.0-961-48.0 20.0-908-45.4	20th Century Ltd. Broadway Ltd.	20.0-979-48.9 20.0-909-45.4	20th Century Ltd. Pennsylvania Spec.	18.0-983-54.6 18.0-909-50.2	19
20	Boston-Chicago	B. & A., N. Y. C.	20th Century Ltd.	22.25-1019-45.8	20th Century Ltd.	22.25-1038-46.5	20th Century Ltd.	20.5-1043-50.9	20
21	New York-Jacksonville	Atlantic Coast Line	Havana Spec.	22.5-1021-45.4	Florida Spec.	27.0-1021-37.8	N. Y. and Florida Spec.	24.8-1018-40.1	21
22	Chicago-Jacksonville	Illinois Central	Floridian	29.1-1127-38.7	Seminole Ltd.	34.9-1132-32.4	Seminole Ltd.	33.1-1133-34.2	22
23	New York-St. Louis	New York Central Pennsylvania	Southwestern Ltd. Spirit of St. Louis	23.0-1156-50.2 23.0-1052-45.7	Southwestern Ltd. St. Louis	26.6-1158-43.5 24.8-1053-42.5	Southwestern Ltd. 24-hr. St. Louis	24.0-1175-49.0 24.0-1060-44.2	23
24	Boston-St. Louis	B. & A., N. Y. C.	Southwestern Ltd.	25.8-1215-47.1	Southwestern Ltd.	29.1-1216-41.8	N. Y. Central Ltd.	26.1-1235-47.3	24
25	New Orleans-Los Angeles	Southern Pacific	Sunset Ltd.	56.3-2008-35.6	Sunset Ltd.	62.5-2003-32.5	Number 9	75.6-2003-26.9	25
26	Chicago-Los Angeles	Santa Fe Union Pacific	Chief Los Angeles Ltd.	56.0-2228-39.8 61.0-2299-37.7	California Ltd. Overland Ltd.	71.5-2231-31.2 72.2-2301-31.9	California Ltd. Los Angeles Ltd.	72.0-2267-31.5 72.0-2310-32.1	26
		C. R. I. P., So. P.	Golden State Ltd.	61.0-2281-37.4	Golden State Ltd.	73.5-2276-31.0	California Spec.	72.0-2275-31.6	
27	Chicago-San Francisco	C. & N. W., U. P., So. Pacific	Overland Ltd.	56.0-2261-40.9	Overland Ltd.	72.0-2264-31.4	China & Japan Fast Mail	66.5-2278-34.3	27
28	Portland-Chicago	Northern Pacific Great Northern Union Pacific	North Coast Ltd. Empire Builder Portland Rose	57.5-2316-40.3 57.25-2245-39.2 57.5-2272-39.5	North Coast Ltd. Oriental Ltd. Oregon-Wash. Ltd.	72.0-2312-32.1 72.0-2243-31.2 72.0-2266-31.5	Northern Pacific Exp. Oriental Ltd. Oregon-Wash. Ltd.	72.0-2319-32.4 72.0-2294-31.9 72.0-2291-31.9	28
29	Seattle-Chicago <sup>7</sup>	Northern Pacific Great Northern C. M. St. P. & P. <sup>6</sup>	North Coast Ltd. Empire Builder Olympian	58.5-2335-39.9 57.25-2196-38.4 58.0-2188-37.7	North Coast Ltd. Oriental Ltd. Olympian	73.2-2335-31.9 72.0-2206-30.6 72.0-2190-30.4	Northern Pacific Exp. Oriental Ltd.	74.25-2342-31.5 72.0-2256-31.3	29
30	Montreal-Vancouver	Canadian Pacific	Trans-Canada Ltd. <sup>8</sup> Imperial	86.25-2886-33.5 98.75-2886-29.2	Imperial	111.25-2886-25.9	Pacific Exp.	112.5-2897-25.8	30

**Total times and mileages of fastest trains on each run** ..... 743.5 hours—30,463 miles  
**Average speed maintained by 30 fastest trains** ..... 40.9 mi/hr.

<sup>1</sup> When two or more trains of same railroad maintain schedule listed in the Table, the name of but one appears. Examples: Illinois Central now has two 6.5 hr. trains between Chicago and St. Louis, *Michigan Boulevard* and *Daylight*; Chicago & Eastern Illinois on same run also has two, *La Salle* and *Zipper*.

<sup>2</sup> In 1920 and 1910 this part of present Canadian National was part of Grand Trunk Railway System.

<sup>3</sup> *Inter-City Ltd.* maintains 6 hr. schedule eastbound only; *International Ltd.* maintains it westbound.

<sup>4</sup> The present Chicago, Milwaukee, St. Paul and Pacific was the Chicago, Milwaukee and St. Paul in 1920 and 1910.

<sup>5</sup> In 1910 the Southern maintained no through Cincinnati-New Orleans service.

<sup>6</sup> In 1910 the Chicago, Milwaukee and St. Paul maintained no through Seattle-Chicago service.

<sup>7</sup> If schedules in opposite directions differ, the fastest is listed in the Table. Examples: *North Coast Ltd.* now has a schedule of 58.5 hrs. eastbound Seattle to Chicago and 60.25 hrs. westbound; *Empire Builder's* eastbound schedule between same points is 57.25 hrs. and 59.15 hrs. westbound; *Olympian's* eastbound schedule is 58 hrs. and 59.75 hrs. westbound. Such differences are usually to permit arrivals at intermediate terminals of importance and convenient connections with other trains.

<sup>8</sup> *Trans-Canada Ltd.* — summer train only.



## *Prodigality in the Natural Gas Industry*

THAT the conservation and use of natural gas affords a means of conserving our oil supply is a fact not generally known to the layman. Neither does he realize that, despite the growing use of natural gas, conservation has made little headway and that millions of cubic feet of gas are being wasted every day in bringing oil to the surface — one of the most appalling in the long list of stupidities prevalent in the exploitation of our natural resources.

In 1929 the *consumption* of natural gas in the United States was 1,918 billion cubic feet, or about five billion cubic feet per day. It is estimated that the total *production* amounted to seven billion cubic feet per day. What happened to the difference? It was blown into the air, completely wasted. Since the average price of gas at the wells in the United States was 8.2 ¢ per M (1,000 cubic feet), the value of this wasted gas at the well amounted to approximately 60 million dollars for the year. At the point of consumption it would have been worth 160

million dollars. That was in 1929. Conditions were probably worse in 1930.

It must be understood that most of our wasted natural gas comes out of oil wells (oil is produced in 18 states and natural gas in 23); that it is a by-product of oil production. Since there is an over-production of oil, it becomes immediately evident that the control of gas wastage would also mean a reduction of oil production. It is estimated that the two billion cubic feet of gas blown wild in 1929 represented the production of 400,000 barrels of oil, none of which the world actually needed. The oil wells in the United States, from which gas is conserved and used, supply enough oil for present demands and oil brought up with the wasted gas simply represents a glut on the market.

Several producing states have passed laws making it illegal to allow gas to blow wild and the United States Supreme Court has upheld this method of oil conservation. Despite these examples, the following table shows the estimated wastage in million cubic feet per day in several states during 1929:

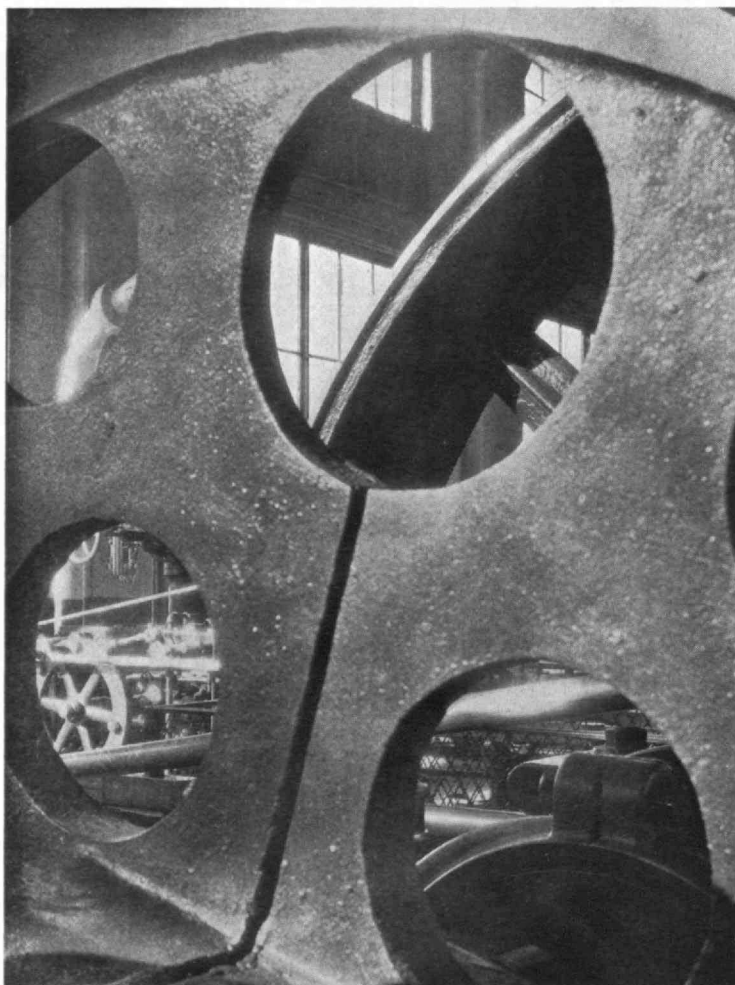
California.....	600
Oklahoma.....	400
Texas Panhandle.....	500
West Texas and New Mexico.....	250

Not only does gas blown in the air represent a waste of gas, but it likewise represents an actual waste in oil since it carries with it a certain amount of oil. The wasted gas probably contains about one gallon of gasoline per 1,000 cubic feet. *It is also true that it is the gas which expels the oil from the sand and that the more efficiently the gas is used, the greater the extraction of oil from the sand.* Natural gas is the most convenient known fuel for domestic purposes. It contains practically twice as much heat per unit as artificial gas and it has a minimum of dirt, smoke, and odor. In short, it is one of our most precious resources and one that we can ill afford to blow skyward at the rate of two billion cubic feet a day. Is it not possible that some adequate method of public control can be devised which will prevent this wild wastage and at the same time keep oil in the ground that we do not need?

## *What Price Beryllium?*

ALUMINUM was once a metal so rare and costly that only a prince could have an object made of it. Does its history, as related by Dr. Williams on page 229, reveal the future of a similar metal, beryllium, almost as expensive and as difficult to separate from its compounds as aluminum once was?

Beryllium is widely distributed in nature, and its principal mineral is found in many places. It has been mined chiefly as a mineralogical specimen,



M. I. T. Photo

STILL LIFE IN THE STEAM LABORATORY



for this mineral, beryl, sometimes occurs in very beautiful and gigantic hexagonal crystals; one form, indeed, is one of the rarest and most valuable gems, emerald. Beryl is found in association with mica and feldspar, and in some localities where these two minerals are mined, the beryl has been rejected as mere gangue; it is said that there are quite large accumulations of the mineral on the dumps.

Within the past year, however, several things have occurred which seem to point to almost immediate development of a cheap process for the recovery of this metal, and consequently a quick extension of its use. A manufacturer in New York City has announced that he has a new process which will make it possible to produce beryllium so that it can be sold for three or four dollars per pound, and that within a year after the establishment of his factory, which will be erected immediately, it can be sold for perhaps two dollars. At about the same time there comes a promising preliminary announcement from two chemists in the laboratories of Western University of a process for electrolyzing beryllium compounds.

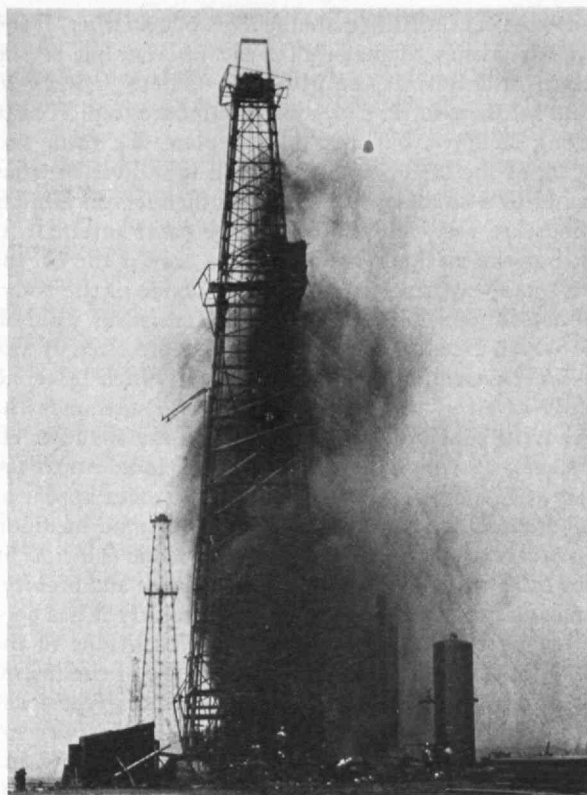
At the same time, several investigators are busy trying to learn all there is to know about the properties of this metal and its alloys, preliminary to developing a practical use for these new substances. In the United States, greater attention is being directed to alloys with aluminum, magnesium, and silicon, which are all of small specific gravity. In Germany, the alloys with the heavier metals are receiving the greatest attention.

Beryllium is lighter than aluminum, which it resembles in appearance. Unfortunately, unlike aluminum, it is brittle, and therefore not easily worked. It is true that one investigator in England claims to have produced an extremely pure beryllium that is malleable and ductile; but this is contrary to the experience of others. Unless a workable pure metal is ultimately found, the chief use, of course, will be in the form of alloys.

Recent experiments made through a series of years in the laboratories of the Siemens-Konzern in Germany seem to indicate that alloys with the heavier metals will have very useful properties, even when the proportion of beryllium in the alloy is small. For example, alloys of beryllium and copper show properties which indicate their adaptability to uses where bronzes and brasses have had their greatest application, such as in bearings and springs. Beryllium copper alloys are of greater strength than phosphor bronzes. One test in hard usage was on electric locomotives for the contact-brushes on the motors and for the collectors sliding on the third rails. These alloys are also resistant to corrosion by most agents, and therefore can be used for pumps and liquid measuring apparatus in chemical factories. Parts can be made by extrusion methods.

In the United States, as has been said above, greater attention has been paid to alloys with aluminum, magnesium, and silicon, principally for use in airplanes. One recent writer has figured that if airplanes could be made of these very light alloys, an airplane now carrying a paying load of 4,500 pounds could be made to carry a load of 7,500 pounds. But little has been made public of the results obtained by investigators of these alloys.

Beryllium, although very light, is very hard, and will scratch ordinary glass. It has about the same strength as steel, and about the same elasticity; its melting point,



George W. Noble

OIL AND GAS CHALLENGING HUMAN CONTROL. MARY SUDIK BLOWING WILD, APRIL 4, 1930

1,280° C., is about the same as cast iron, and it has about the same coefficient of thermal expansion. Beryllium is very avid for oxygen; it soon tarnishes in the air, and will perhaps find use as a deoxidant. For this reason, beryllium alloys are free of occluded gases (blowholes) and oxides. In making alloys, therefore, they must be made in an oxygen-free atmosphere. Beryllium, too, forms carbides and nitrides with the greatest ease.

There seems to be a distinct future for this metal. The raw material, beryl, is abundant, and if there was a large demand, it could be furnished cheaply. If a cheap process for the isolation of the metal is developed, we may expect it to become one of the commoner useful metals. Readers may obtain from *The Review* a bibliography on this promising metal.

### *Organic Chemistry in X-Ray Diagnosis*

PHYSICIANS are nowadays no longer under the necessity of making wise guesses relative to disarrangements inside of their patients. If their thumping, prodding, and poking give them grounds for suspicion, they withhold their judgment until they have looked to see. X-rays are a certain means of revealing fractures. They generally show abscesses and other growths. With the help of suitable adjuncts they show the position of the internal organs and the morbid conditions which may exist in them. They make hidden things obvious and have made diagnosis a matter of rigorous inference.

Dense matter, such as a bone or a stone of calcium urate, casts an x-ray shadow which may be recorded on a photographic plate. But the soft parts of the body give little or no shadow and appear as a formless blur. Adjacent

organs are thus indistinguishable from one another. If the physician wishes to make an x-ray photograph of the stomach or intestines, he gives the patient a drink of barium sulphate milk. The barium sulphate, which casts a strong shadow, outlines on the plate the form and position of the organs which contain it and yields what amounts to a shadow of the organs themselves. Similar methods are used for photographing other internal organs, but the methods are applicable only if the organs are in some way accessible from the outside of the body.

Stones in the kidney sometimes consist of calcium urate which casts a good shadow, but more often of uric acid and most frequently of cystine, which give no shadow at all. The physician, therefore, surrounds the stones with a medium which gives an x-ray shadow. He introduces a strong solution of sodium iodide into the kidney. On the photographic plate the stones appear as transparent objects surrounded by an opaque medium. The process of introducing the pyelographic solution by means of an instrument through the urethra and ureter is not pleasant for the patient, but until recently it has been the best that could be done. Morbid conditions in the organs not infrequently have made the use of the instrument impossible, and this has been in cases where the necessity for an accurate diagnosis has been most urgent.

Gall stones of cholesterol yield no x-ray shadow and have presented a difficult problem because the gall bladder is inaccessible from the outside of the body. Compounds of iodine, however, are known to be opaque to x-rays. Organic chemistry has supplied a compound, tetra-iodo-phenolphthalein, which, when injected intravenously, collects in the gall bladder and makes it possible to secure a clear-cut picture of any stones which may be present. This aid to diagnosis has been in use for several years.

The most recent achievement in this field, scarcely a year old, is the use of an organic compound of iodine for x-raying the kidney and bladder. The sodium salt of iodo-oxy-pyridine-acetic acid, if injected intravenously, goes to the kidney and bladder and makes it possible to secure photographs without the use of an instrument in the organs themselves. If the intravenous injection is not altogether pleasant for the patient, it may be that the organic chemist will some day be able to find some substance for the same purpose which may be taken through the mouth in a glass of milk or ginger ale.

### *Sulphur in Soap*

ORDINARY sulphur frequently produces a skin irritation that precludes its use in soap and reduces its effectiveness as a skin remedy. A new type of sulphur, the by-product of the thylox process of gas purification, seems to be free of these undesirable properties; in fact, it seems to possess unusual qualities that commend it to manufacturers of insecticides, fungicides, and soaps.

Thylox sulphur is of a colloidal nature, an exceedingly fine grade of pure sulphur derived from the hydrogen sulphide in coal gas. The idea that it might be advantageously used in soap was hit upon during a toxicological investigation of the thylox purification process by the Koppers Research Corporation. It was noticed by the investigator, Dr. Emery R. Hayhurst, of Ohio State



ARCHITECTURE BY TWILIGHT. CENTER: NEW YORK "DAILY NEWS" BUILDING. RIGHT: CORNER OF CHRYSLER BUILDING

Galloway

University, that some of the workmen were using the by-product sulphur as a hand cleanser. When questioned, they claimed that it had excellent cleansing qualities, and that it seemed to be beneficial to the skin of those who were exposed to salt solutions encountered in the processes. The Koppers Research Corporation thereupon began to experiment with the sulphur as a detergent combined with a soap base. Once the soap was made, Dr. Hayhurst investigated its uses and effects. From his preliminary study he concluded that the soap is unusually bland in its effects on the normal skin, including the scalp. He further found that the soap has prompt, beneficial and even curative effects on the simpler forms of skin diseases, and that it has pronounced preventive and curative properties in certain occupational dermatoses, such as platers' rashes, "machinists' boils," and the like.

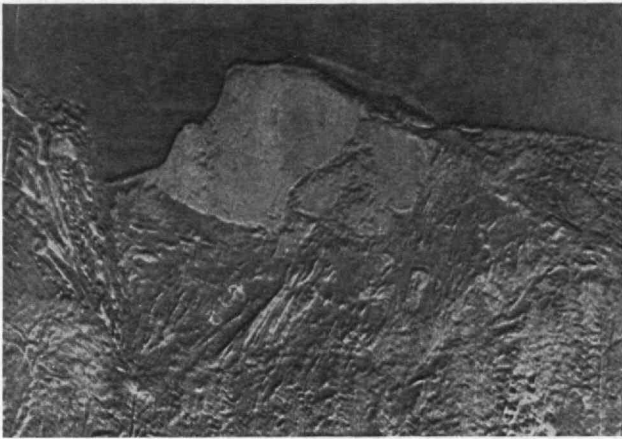
While the thylox sulphur may be used as a paste, ointment, or powder, its successful use as a detergent in soap is noteworthy and commands particular attention as a preventive of occupational dermatitis.

### *Temperature According To Whims*

MANUFACTURED weather which would make a home in the tropics cool and comfortable is now a possibility. Cooling systems such as those used in theaters, department stores, hotels, and other buildings for public use, can now be installed in the home. Already several concerns producing mechanical refrigerators have announced small air conditioners for home use.

In these robot weather-makers, inventors endow a single machine with ability to control humidity as well as temperature. In this process the air is washed, chilled or





RELIEF PHOTOGRAPH OF THE HALF DOME, YOSEMITE VALLEY, TAKEN BY PAUL F. JOHNSON, '98. THE RELIEF EFFECT IS OBTAINED BY OFFSETTING A NEGATIVE SUPERIMPOSED UPON ITS OWN WHITE PRINT

heated, and humidified. The necessary equipment for this unit are fans for moving the air, refrigerating machines or heaters for tempering it, and pumps to provide sprays for cleaning and humidifying it. One typical home unit is designed to condition air for a room of 300 square feet of floor space, occupied by not more than six persons. Varying with conditions, this unit will lower the temperature of the room about 10° F. and the humidity 10% representing a 15° F. sensible lowering of the temperature. Air is taken in from near the floor, is passed over an evaporator kept at 40° F., cooled below the dew point, and excess water vapor is precipitated. The air, slightly warmed, is then sent into the room. The readiness with which people accept other devices for the home presages the future of this.

### *Dam of Dams*

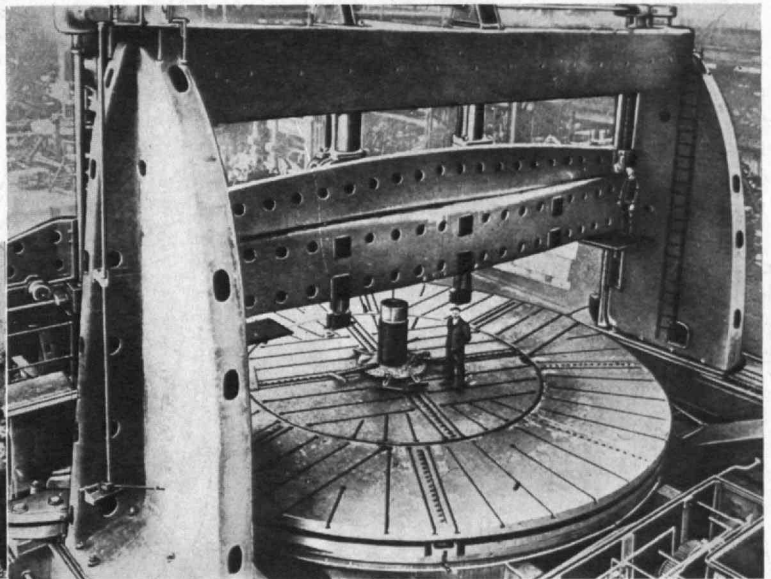
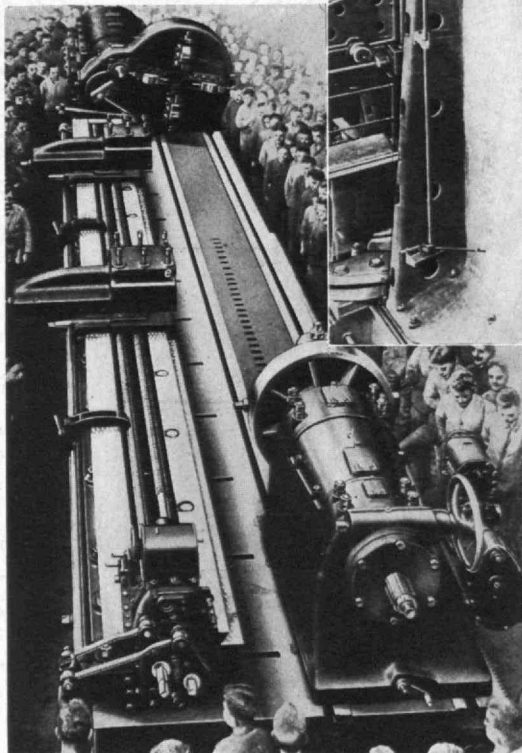
CHAPTER one of the enterprise to control the Colorado by damming it in the gorge of Black Canyon opens next month in Denver. There, on the second anniversary of Hoover's inauguration as President, in the office of the United States Bureau of Reclamation are to be opened bids for building Hoover Dam.

A decade of foreword and preface writing has culminated in

placing a table of contents and synopsis in the hands of contractors six months ahead of time and, in the considered words of the customarily restrained editors of the *Engineering News-Record*, they are "plans and specifications of rare perfection." It is now evident, continue the editors, that Hoover Dam, which "has been thought of as excelling chiefly in size," is the "most advanced, the boldest and most thoroughly studied hydraulic enterprise in history."

Should all go well on March 4, an award may be expected before the lapse of another month and by mid-summer the seven-year program of putting 135,000,000 cubic feet of concrete and 35,000,000 pounds of reinforcing bars and rails into their assigned places, and for attending to such fantastic quantities as 70 miles of grouting holes, 28 miles of copper water stops, and 2,035 tons of needle valves, can get well under way. The Government's wish is to include in a single contract diversion tunnels, coffer and main dams, spillways, intake and outlet works as well as an inclined freight elevator on the Nevada side of the river.

The Review for March, 1929, noted that a board of geologists and engineers, of which Dr. Charles P. Berkey of Columbia was a member, had, after a painstaking and official study, indorsed the general practicability of what was then called the Boulder Dam project. They recommended, however, that foundation loads be 30 tons per square foot rather than 40. Their wish prevailed and the



*International*

GERMANY BUILDS TWO MONSTER LATHES: ABOVE, IN DUSSELDORF; BELOW, IN WESTPHALIA. THEY ARE SAID TO BE THE LARGEST IN THE WORLD





designs upon which contractors are now preparing estimates have been passed upon favorably by the same board.

Except for certain details which may not be determined until after construction begins, the present designs are indicative of what one may expect to come upon if during the next few years he moves about in the vicinity of that newest of boom townsites whose coming occupancy was mentioned in these columns last November. Now, on the maps furnished to contractors, it is Boulder City, Nev., a community guaranteed a thriving existence until 1938 at least, for it is to be the GHQ for the builders of Hoover Dam. The drawings on page 242 disclose by plan and longitudinal section the various dates of the operations schedule. Spillway and diversion tunnels are to be ready two years from next autumn; coffer dams late in the following spring. A start on placing concrete in the dam itself is due in December, 1934; impounding water is to begin by June, 1936; power is to be generated commencing in September, 1936.

Except for spillways, much of the work until the late summer of 1933 will be underground, preparing to divert the river through four concrete-lined tunnels all on the same level. Later, after serving as diversion tunnels, these bores are to have permanent duties: two as penstocks and two as the lower ends of the spillway discharge system.

Each tunnel is to be 50 feet in inside diameter and about 4,000 feet long, which dimensions may be compared with the size of the Holland tunnels under the North

River and the River Mersey vehicular tunnel, between Liverpool and

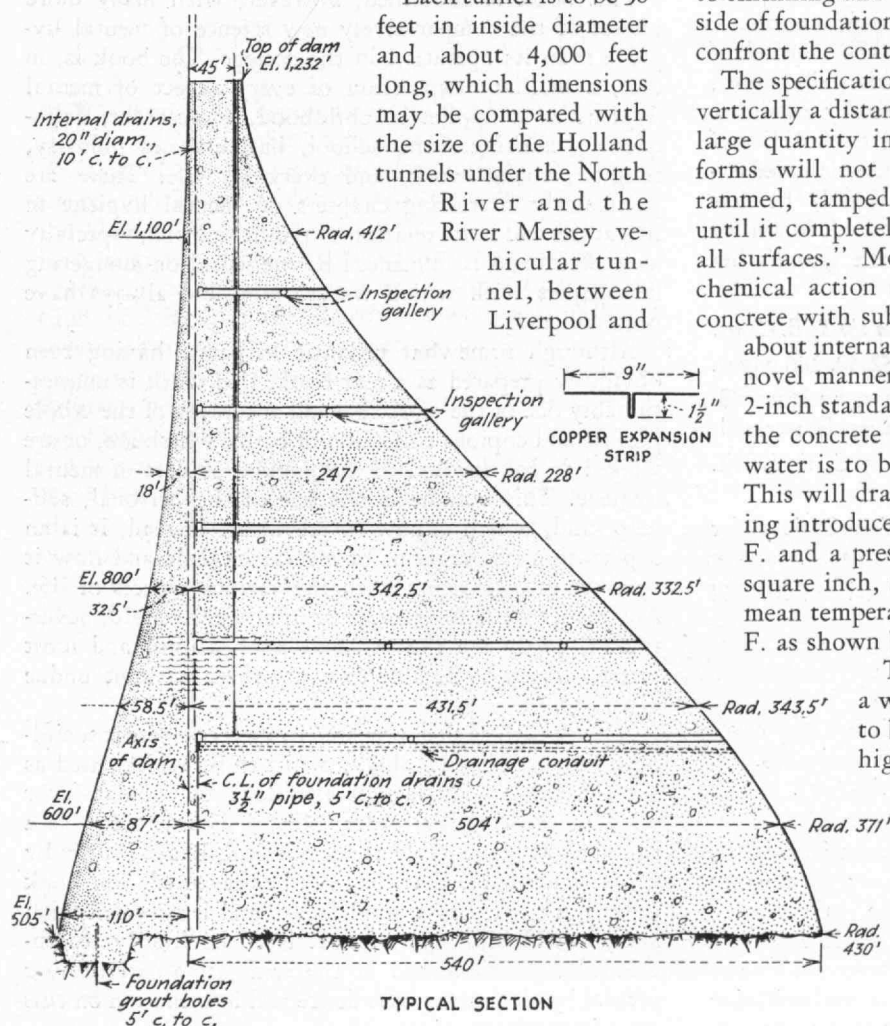
Birkenhead, England. The two Holland tubes are 29 feet in exterior diameter and 1.61 miles in length; the Mersey tube has an inside diameter of 44 feet and its total length, including two branches on each side of the river for entrance and exits, is 2.93 miles. Upon completion this year the Mersey tube will be the largest circular tube tunnel in the world and its two roadways, an upper and lower, will accommodate six lines of vehicle traffic and two foot-walks.

With the Colorado directed into the four diversion tunnels, building the coffer dams and excavation for the Hoover Dam proper are to start. The latter is of an arched form suited to the steep-sided canyon location with hard rock walls. On the axis its radius is 500 feet. From the lowest foundation point to the crest it will measure 730 feet and the length at the top will be 1,180 feet. Mathematical analysis and model tests have been exhaustively applied to provide a design to withstand the lateral action of likely loads on the upstream face of the dam due to action of impounded water on its arched form.

Massive columnar prisms of concrete 50 feet square in plan are to form the integral parts of the dam. Upstream and downstream vertical faces of these prisms will be curved on the alignment of the dam; the radial joints will be keyed and afterward grouted under pressure to create a solid arch. This method is expected to avoid cracking due to shrinking and thus cope with a difficulty which, outside of foundation problems, is one of the most serious to confront the contractors.

The specifications provide that "dropping the concrete vertically a distance of more than five feet or depositing a large quantity in one place and working it along the forms will not be permitted. All concrete shall be rammed, tamped or worked with suitable appliances until it completely fills the forms or fits snugly against all surfaces." Moisture change and heat generated by chemical action during the setting of large masses of concrete with subsequent cooling and contraction bring about internal stresses which are to be dealt with in a novel manner. Cooling ducts (800,000 linear feet of 2-inch standard pipe and fittings) are to be placed in the concrete and through this network refrigerated water is to be circulated during the setting process. This will draw off the heat — the cooling water being introduced at a temperature of not less than 35° F. and a pressure of not more than 100 pounds per square inch, and circulation is to continue until the mean temperature around each pipe is reduced to 72° F. as shown by embedded thermometers.

The power house is to be U-shaped with a wing on each canyon wall. Each wing is to be 500 feet long, 66 feet wide and 85 feet high from generator floor to roof. After notice to begin work the contractor is allowed 1,600 days to complete the wings, including six units apiece and foundations for two remaining units. On this, and all subdivisions of the work, damages to the amount of \$3,000 per diem are to be assessed the contractor for delays. Once coffer dams are completed the government assumes the flood damage risks.



TYPICAL SECTION

Courtesy Engineering News-Record and U. S. Bureau of Reclamation

SECTION OF HOOVER DAM. SEE OPPOSITE





## BOOKS



### *Scientific Book Club Selections*

**B**Y special arrangement with the Scientific Book Club, Inc., *The Review* is to present each month a list of books selected by that body as meriting the careful attention of all who desire to keep abreast of scientific thought. The selections are made by an editorial committee consisting of Arthur H. Compton, Edwin G. Conklin, Kirtley F. Mather, Harlan T. Stetson, and Edward L. Thorndike.

*For January the principal selection was:*

AFRICA VIEW, by Julian Huxley. \$5.00. 466 pages. New York: *The Scientific Book Club, Inc.*

" . . . a record of a visit of four months to the East African Territories of Uganda, Kenya, Tanganyika and Zanzibar with a dash into the Belgian Congo. But it is more than the usual book of travel and adventure in strange lands, for it is written by a distinguished biologist (grandson of Professor T. H. Huxley) who was sent out by the British Colonial Office Advisory Committee on Native Education, and consequently it is a popular work dealing with many topics in a scientific manner.

"Its author has deliberately adopted the method of interspersing a diary record, based on his daily notes, with chapters on particular topics, thereby retaining vividness and variety without sacrificing the solidity of ideas which reflection crystallizes from many isolated experiences. While fluent and conversational, he has given due regard to scientific accuracy. Indeed, in ability to make science popular, the mantle of the grandfather has fallen upon this grandson. . . ."

*Other highly recommended books obtainable from the S. B. C. are:*

RACE PSYCHOLOGY, by Thomas R. Garth. \$2.50. 246 pages.

THOMAS SAY, EARLY AMERICAN NATURALIST, by Harry B. Weiss and Grace M. Ziegler. \$5.00. 260 pages. Illustrated.

WORLD MINERALS AND WORLD POLITICS, by C. K. Leith. \$2.00. 193 pages. Illustrated.

ANDRÉE'S STORY, edited by The Swedish Society for Anthropology and Geography. \$5.00. 400 pages.

AMBER TO AMPERES, by Ernest Greenwood. \$4.00. 344 pages. Illustrated.

### *Keeping the Mind Healthy*

INTRODUCTION TO MENTAL HYGIENE, by Ernest R. Groves and Phyllis Blanchard. \$4.00 (Student's edition \$3.25). 467 pages. New York: *Henry Holt and Company*.

**O**N those rare occasions when a college student commits suicide, the more vapid representatives of the daily press, a category in which too many newspapers can be included, invariably ascribe the calamity to "overstudy." If newspaper owners were sensible enough to employ psychiatrists to advise and instruct their news writers, and if editors would read a few authoritative books on mental hygiene, they might have a more reasonable conception of this and other problems.

Suicide is generally the product of a disordered personality. It is usually caused by no immediate traumatic event, but results as the culmination of a long series of mental strains and emotional stresses. The individual prone to the suicidal mania is likely to indulge in it whether he happens to be a college student who chooses thus to embarrass the university authorities, or whether he is an old grad, or merely an obscure tradesman in a depressing environment.

Progressive colleges are beginning to realize that mental hygiene is a necessary part of their administration and instruction. As is well expressed in the engrossing chapter in this book on mental hygiene in the college, this recognition has come not because mental diseases are rampant in universities, but because the institution has a definite responsibility as a possible distributor of the accepted principles of mental hygiene. The science is applicable, incidentally, not only to students but also to faculty members, some of whom would profit greatly from psychiatric attention.

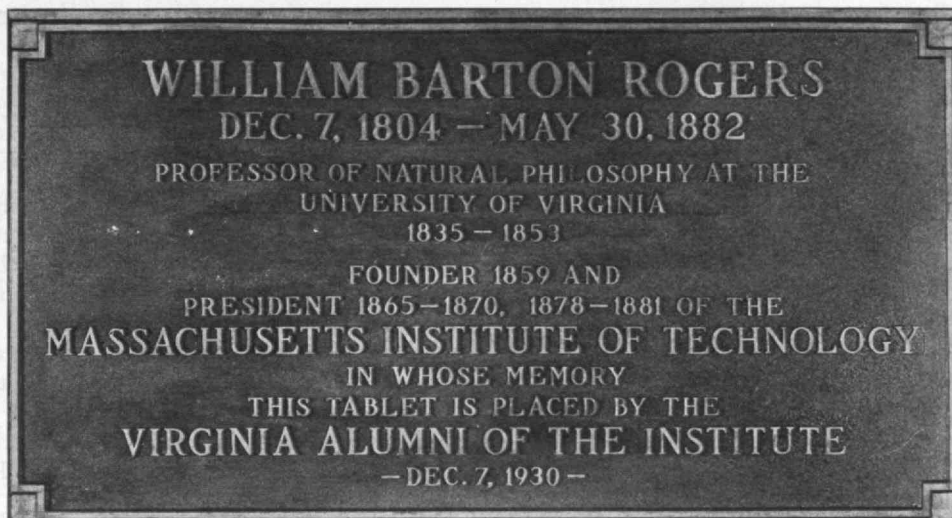
This book is concerned, however, with many more phases of the comparatively new science of mental hygiene than its operation in the college. The book is, in fact, a brilliant exposition of every aspect of mental hygiene as it applies to childhood, adolescence, delinquency, marriage, the school, business and industry, religion, social work, and every-day life. There are particularly interesting chapters on mental hygiene in literature, and in its relation to public opinion, especially as it affects and is influenced by the sensation-mongering newspapers with which we are now and always have been afflicted.

Although somewhat pedantic in parts, having been obviously prepared as a text book, this work is unquestionably one of the most able and absorbing of the whole profuse and copious collection of books which are, or are alleged to be, devoted to the popular subject of mental hygiene. This volume is not one of the personal, self-help kind, which is now so prevalent. Instead, it is an explanation of the scope of mental hygiene and how it operates in connection with the various aspects of life. Any reader with any vestige of intelligence could, nevertheless, easily see the personal applications, and most persons ought to be able to apply them without undue difficulty.

A book such as this, prepared by two competent sociologists expert in psychology, ought to be widely used as a college text book, and it also deserves popular favor with the general lay reader. Mental disorders are, as a rule, just as preventable as are physical, but it is only by proper knowledge that they can be prevented. The book is well printed, has a good index, and is supplied with many useful bibliographies. It is to be highly recommended for serious and at the same time entertaining perusal by all persons who desire real information on this most important subject.

JAMES A. TOBEY





## A MEMORIAL TO ROGERS

*The Founder of the Institute Is Honored at the University of Virginia*

BY LAUREN B. HITCHCOCK

FOUR men sat beneath a picture. One of them was Samuel Wesley Stratton, Chairman of the Corporation of the Massachusetts Institute of Technology; the second, Edwin Anderson Alderman, first president of the University of Virginia (prior to his accession, the University was headed by the Chairman of the Faculty); another, J. Scott Parrish '92, President of the Technology Club of Virginia; the fourth, Llewellyn G. Hoxton, senior physicist at the University of Virginia. Their common interest was the memory of William Barton Rogers; the occasion, dedication of a bronze tablet on his 126th birthday.

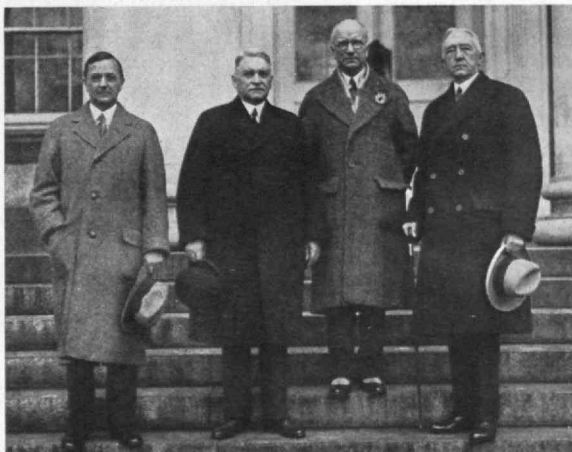
The canvas bears the likeness of an old gentleman who must have been mentally alert, hard-working, yet above all, serene. The name plate describes him as one who was professor of natural philosophy at the University of Virginia from 1835 to 1853, nothing more. Perhaps when the painting was hung in the Chemical Laboratory in 1881 the true significance of his other achievements had not been recognized. Nearly 50 years of chemical atmosphere had almost obscured his features when the Technology Club of Virginia recently discovered this fading memorial, inadequately identified to most of its beholders. They decided to place a tablet beneath

the portrait, setting forth as simply as possible the principal achievements of the subject — William Barton Rogers.

With the approaching exercises of presentation but a few weeks off, it became apparent that the picture was not in appropriate condition. Almost sole relic of the old chemical laboratory which burned to the ground in 1916, the canvas was blackened and torn. The Art Commission of the State of Virginia dispatched it to Cambridge, Mass., where the J. F. Olsson Gallery performed a work of restoration which seems incredible to those who knew the picture. Today, resplendent in new gold leaf and safely sealed under glass from laboratory fog, Dr. Rogers is prepared to gaze benignantly over the heads of future generations.

Thus it happened that on December 7, 1930, in the presence of a notable gathering at the University of Virginia, Mr. Parrish unveiled the metal plaque, bearing a brief but permanent statement of facts familiar enough to us today. In presenting it on behalf of the Technology Club of Virginia, he said:

"... it was here that he spent 18 years of his life; it was here that he received the great inspiration to found the Massachusetts Institute of Technology at Boston. We think of what that institution has done, and of the (Continued on page 258)



AMONG THOSE PRESENT AT THE DEDICATION. LEFT TO RIGHT: DR. L. G. HOXTON, DR. S. W. STRATTON, MR. J. SCOTT PARRISH, AND PRESIDENT EDWIN A. ALDERMAN



## *Annual Dinner*

**P**LANS under way for the Annual Dinner of the Alumni Association to be held at the Hotel Statler, Boston, on February 28, indicate that it will eclipse any dinner held for many years. The Institute is to present in the rooms adjacent to the Statler ball room a series of important exhibits, and prior to the dinner there is to be a reception at which the Alumni will have an opportunity to meet Dr. Stratton, President and Mrs. Compton, and other representatives of the Faculty and Corporation.

Ladies are invited to the dinner and Alumni are urged to come accompanied. A dance will cap the evening.

## *Corporation News*

**A**T THE meeting of the Institute's Corporation on January 9, three life members were elected to that body: John R. Macomber, '97, President of Harris Forbes and Company, Inc., Albert H. Wiggin, Chairman of the Board of the Chase National Bank of New York, and Alfred L. Loomis, banker and physicist of New York. Biographical sketches of each of these new life members will be presented in the March issue of The Review.

At the same meeting Mr. Macomber was appointed to the Committee of Finance; Mr. Gerard Swope, '95, President of the General Electric Company, and Mr. Arthur D. Little, '85, President of the Arthur D. Little, Inc., were appointed to the Committee on Membership; Godfrey L. Cabot, '81, was appointed Chairman of the Visiting Committee on Humanics; and to the Committee of Hygiene, Lammot du Pont, '01, and William R. Kales, '92. The jurisdiction of this last committee was extended to cover athletics at the Institute.

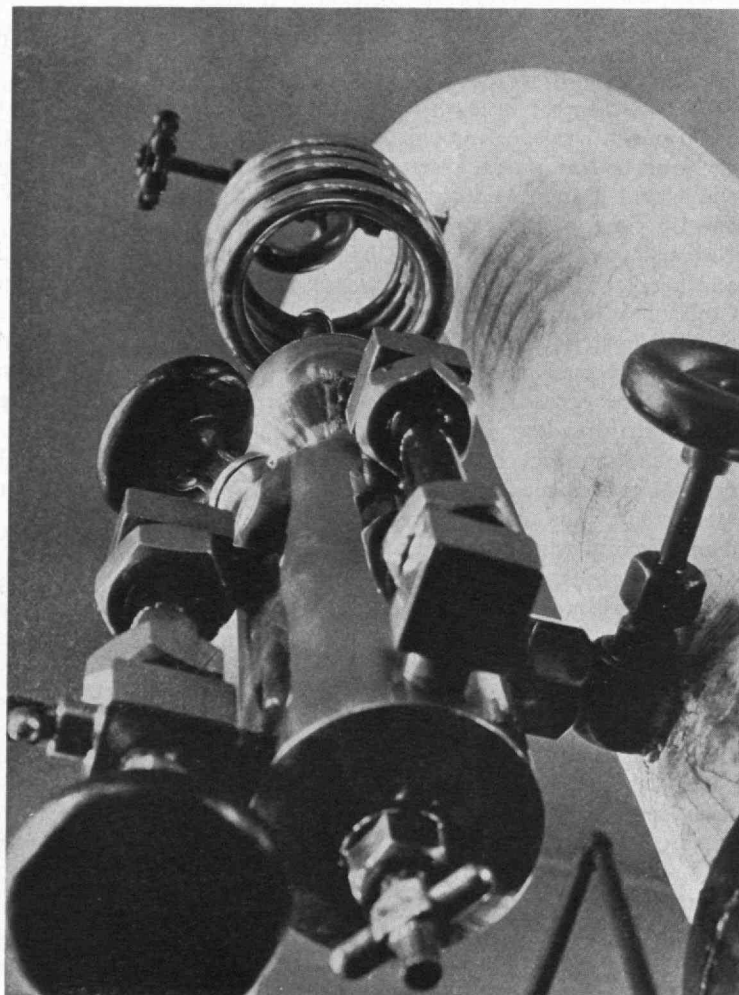
Reports of progress were made by the visiting committees of the Departments of Naval Architecture and Marine Engineering, Electrical Engineering, Business and Engineering Administration, and the Division of Industrial Coöperation and Research. Twenty-two advanced degrees and 52 degrees of bachelor of science in various branches of engineering were approved by the Corporation at this meeting.

It was announced that Igor N. Zavarine, S.M., '20, of the Department of Mining and Metallurgy had been promoted to the grade of assistant professor in that department. He is a member of the American Institute of Mining and Metallurgical Engineering, the American Institute of Mechanical Engineers, the American Society for Steel Treating, the Iron and Steel Institute, and the Institute of Metals of Great Britain. The resignation of Professor Henry O. Forrest, '20, of the

Department of Chemical Engineering, and Director of the Research Laboratory of Applied Chemistry was also announced. Professor Forrest is to join the M. W. Kellogg Company, manufacturers of oil refining machinery, and is one of a large group of Technology men who have recently been called to leading industrial positions. Professor Leroy F. Marek, a graduate of the University of Texas, and a member of the Chemical Engineering Department, was appointed Acting Director of the Laboratory of Applied Chemistry to succeed Professor Forrest.

## *Alumni Seminars*

**A**S ANNOUNCED by Dr. Compton at the dinner of the Technology Club of New York on December 8, and as recorded in the last Review, a series of Alumni seminars have been started in New York. The first of these, devoted to electrical engineering, was held at the Technology Club of New York on January 12, when Professors Dugald C. Jackson, Vannevar Bush, '16, and Edward L.



M. I. T. Photo

INTRAVENOUS INJECTION IN THE INSTITUTE'S LABORATORY OF STEAM ENGINEERING AND HYDRAULICS

Bowles, '22, represented the Institute. The seminar plan as worked out by the New York Technology Club together with Dr. Compton embodies a series of professional conferences each led by representatives of the Institute's Faculty. Beginning at 5:15 in the evening at the Technology Club, there will be an hour session followed by dinner. At each table of six will be a chairman who will "get from his group a single topic or question and will epitomize the thoughts and reactions of those at his table on the questions of the evening." After dinner the group will reconvene and the professors present will take up in succession the topics presented by the table chairmen.

The Technology Club has so planned these dinners that the charges are very moderate. For members of classes later and including 1920, the charge is \$1.25; for those previous to 1920, \$2.50. The next seminar, devoted to architecture, comes on February 2; the next, devoted to chemistry, on March 9.

### *Chinese Students Directory*

WITH laudable initiative the Chinese Students Club at the Institute has prepared and issued a directory of Chinese students who have registered at Technology since its establishment. Nearly 400 Chinese are listed in this illustrated directory. Of these, 350 have returned to China since leaving the Institute. Seventeen of those listed have doctor's degrees from the Institute.

The first Chinese student to register at Technology appeared in 1877. The largest Chinese registration on record for any single year was 60 in 1921. Electrical engineering has claimed the largest number of these students, with mechanical, chemical, and civil engineering following in succession.

Class, course, thesis, and alphabetical classifications are presented in the book, together with notes on the activities at the Institute and in China of the men listed.

### *New Rating System*

THE Faculty has recently adopted for a trial period a new scholastic rating system so that parents and students may clearly understand the standards which govern the rating of a student's record. This system is based on the results of three years' experimental study of the records of recent classes. The scales of minimum scholastic standards provide for:

1. Immediately eliminating the student who completely neglects to take advantage of his educational opportunities,
2. Warning and eventually eliminating the student who previously has been doing satisfactory work but who is now failing through lack of ability or loss of interest,
3. Warning and eventually eliminating the student whose cumulative performance is below a required quality, and
4. Giving further opportunity to the student whose cumulative record is below standard but who is now improving.

A Committee of Appeal will furnish the necessary elasticity to the system, its function being to waive the application of the rules in those cases where non-academic

reasons, such as sickness, have interfered with the student's work, the student being required to explain the reasons for the interference.

A further study of the scholastic rating system is being made to determine at what stage in the technical school training it is established that certain students have exceptional ability in either science or engineering; which methods of instruction will insure a mental effort on their part, at least comparable to that of the average student, so as to develop their minds and accelerate their progress in their chosen fields; and finally to decide what awards should be offered as incentives to scholarships.

### *T. Coleman du Pont (1863-1930)*

"ABILITY measured by results" was the favorite maxim of T. Coleman du Pont. That this maxim was a workable and guiding principle has been surely demonstrated by the panorama of achievements which made up the life of this industrialist. His is the biography of the man of action — the master builder in the world of affairs. In du Pont's estimation, a man's worth is measured by his accomplishments and in this sense his life has more than reached the standards which he expected of others.

Let us look for a moment at the chain of events marking the life of a successful man. Unlike his famous relatives, Coleman du Pont had to make his own way in the world, unaided by family prestige and without financial support. He was born in Louisville, Ky., December 11, 1863, where he received his early education. Later he entered Chauncy Hall School but was forced to return home for financial reasons. He then went to work in the mines of Central City, where he actually dug coal, drove mules, and served for a time in a blacksmith shop. Having worked there two years, he came to Technology, leaving in 1883 after three years of training in mining engineering. On his return to Central City he became first a mining engineer and then superintendent in the mine in which he had been a laborer. During this period he took an unusual interest in remodeling the city into a well-organized community. Such was his zeal in this behalf that Central City grew from a struggling village to a town of 7,500 inhabitants, a pleasant place to live with comfortable homes, modern conveniences, and a correspondingly increased civic pride. This was no small achievement and such a career in itself would have satisfied the ordinary business man. Coleman du Pont, however, had that in his make-up which urged creation. Once an organization was on its feet in smoothly running order, his interest waned and he was looking for new worlds to conquer, with all the ambitious enthusiasm of the boy Alexander.

We hear much today about the American capitalist and the spirit of American industrialism personified in its leading magnets. Although these men are decried as "materialists" there is a mysterious, intangible romanticism in their love of the material. Back of this outward manifestation is a real philosophy in which they believe as sincerely as any academic philosopher. Carlyle has called it the "work philosophy" and it is suggested by him as the salvation of mankind — work in the right direction toward a goal worthy of attainment. The work



of such far-seeing men as du Pont is but a means to an end just as the money earned is but the tool of the brain which produced it. The romance lies in the beauty of construction, the desire to build worthy things — and no man can judge whether it is better to build a much needed highway for the material welfare of society or to think out the world's problems in prose and verse. Let each man to his own taste.

Du Pont might easily have been the model for the character Uncle Sam drawn most skillfully by John Erskine and presented to the public in his book, "Uncle Sam in the Eyes of His Family." Here is a sympathetic picture — a composite picture of the American captains of industry — of just such men as du Pont. There is in him a goodly portion of the less tangible Uncle Sam — the traditional personality of America.

From mining he turned to steel — the foundation of modern construction. Not long content to be general manager of the Johnson Company steel mills he branched out for himself, going back to Kentucky where he became the president of three mining companies. His success in steel and transportation lines was so great that he retired and bought extensive farm lands in Maryland and Delaware, took up residence there, and began to conduct scientific farming on a large scale.

About this time the head of the du Pont de Nemours Company died and his sons asked their cousin Coleman to take over the business with them. In 13 years he increased the volume of business from \$10,000,000 annually to over \$200,000,000 and the number of employees in the main office from seven clerks to over 3,000. When the war came, however, du Pont resigned the presidency, as the manufacturer of munitions for war purposes was distasteful to him. Although half of the powder used by the government is made by this company, it formed only one per cent of their business prior to the European war. Most of the output was used for blasting in construction, mines, quarries, and tunnels. Today this company makes nearly 300 different commodities, the result of Coleman du Pont's theory that new values in materials would fill in the gaps of declining powder sales.

Enthusiasm for good roads and an appreciation of their benefits to all classes of industry led him to build a model road through the state of Delaware, a project costing some \$2,000,000 and which he supervised and organized with characteristic energy. Today it stands as a worthy monument to a public-spirited industrialist.

The political aspect of du Pont's career was but another outlet for his amazing energy. He was the recognized Republican leader of Delaware, in which state he was chairman of the Republican State Committee for a considerable period. He held the rank of brigadier general by appointment of the governor, and from 1904 to 1924 he was a member of the National Committee, being in charge of the speakers' bureau of the national organization in 1908. In 1921 he accepted an appointment as United States Senator and two years later he was elected for the 1925-1931 term, resigning in 1928 on account of ill health.

After leaving the Powder Company, du Pont, ever restless, conceived the idea of building the greatest skyscraper office building in New York. This urge to build on a large scale, constantly persisting throughout his

life, produced the Equitable Building. The completed structure was sold to buy the building's largest tenant, the Equitable Life Insurance Company, which he promptly mutualized for the benefit of its policy holders. This enterprise well established, he sold the business to the stockholders and entered the hotel business.

During all this time Coleman du Pont retained an active interest in the affairs of the Institute. This phase of his activities was described in the January issue of *The Review*. Perhaps no alumnus is more truly representative of what Technology training actually means, and there are few more generous in their evidence of loyalty. "General du Pont's behind it" was a famous by-word and one never was certain in what direction his dominating energy might break out. Du Pont was responsible for locating the Institute in Cambridge. In face of the opposition of the Selecting Committee to its location on the Charles, he purchased the land personally. When the committee eventually voted to buy the site originally rejected, he presented the deed without their knowing who the donor was. The value of the land meanwhile had increased by \$300,000. This is but one instance of his generous nature.

It must have been difficult for a man with so much vitality to be tied down by ill health, for du Pont suffered from serious throat trouble for several years before his death on November 11, 1930. In 1927 he underwent an operation which necessitated the removal of the greater portion of the larynx, which deprived him of natural speech. A clever voice-recreating mechanism was substituted to permit him to talk in a monotone.

Having thus surveyed the activities which have made du Pont an important personality in America, it might be well to pause and reflect on the meaning of such a life. As we judge characters in a play partly by the opinions expressed by their fellow players, so we may learn something of the individual from what others have said of him. He has frequently been characterized as "an American Pepys in Wall Street." He has also been termed the Roosevelt of big business, for like him, du Pont was a man of lively physical activity, capable of doing many things at one time. An alert person of this temperament, who does whatever he sets his mind to and does it well, is everywhere respected and admired.

Some of his own opinions reflect admirably the trend of his life. "A man may be measured by the way in which he bears success," says Mr. du Pont. "Most of us can manage to bear adversity, whereas a bumper success often ruins us." Again, he speaks in praise of common sense (an uncommon quality, by the way) as an indispensable element of success, showing itself time and again in good judgment and sound decisions. This quality, combined with uncompromising honesty and hard work, makes up du Pont's favorite "success formula." In the light of these remarks we can readily appreciate another of his emphasized points: "Men make an organization, not its bricks or its machinery." Du Pont, moreover, knew how to select men whom he could trust with full responsibility. As no man can possibly be everywhere and into everything in person, keenness in selecting worthy representatives is a distinguishing mark of the successful man. His friends knew him as a hearty, good-natured man, of pleasing personality, tactful and understanding.

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## SCIENCE ENDANGERED

*(Concluded from page 228)*

inspiring understanding of what all this scientific discovery and progress is about? Too often he asks for the bread of interpretation and is given only the stone of minute experimentation.

It would indeed be a cruel fate if the natural and experimental sciences, after their full half century of increasing educational dominance and with their quite unlimited educational possibilities, were now to be sent the way of the ancient classics, and should come to be generally used and known only in their applied and technical aspects, primarily for economic reasons and from motives of gain.

"O, what a fall was there, my countrymen!"

If the natural and experimental sciences are to escape this fate, those who teach and who represent them in the academic life of the world must be able to follow the example of a Huxley and a Tyndall, of a Helmholtz and a du Bois-Reymond, of a Pupin and a Millikan, of an Eddington and a Jeans, and those like-minded and like-spirited with them, who can and will interpret the facts, the findings, the methods and the lessons of the natural and experimental sciences to that multiplying host of intelligent men and women who seek a liberal education in the true sense of that term. Narrowly limited specialization between mounting walls of closely restricted interest, knowledge and skill will not do. That way lies the path to the academic graveyard.

## INVENTION AND ECONOMICS

*(Continued from page 234)*

many varieties and could not be dealt with as a homogeneous mass, developed analytical concepts to deal with labor of various ranks and grades. By such means it is possible, on rational grounds, to account for variations in the rate of wages in different types of occupations. But all this depended on the assumption that the employer could, at least in rough-and-ready fashion, estimate the value to his enterprise of the services of a particular class of workers. Now, due to the highly fortuitous and unpredictable nature of innovation, no such estimation is in general possible, so that conventional wage theories cannot in the nature of things take adequate account of it.

The early Greeks, is so far as they thought at all about what we now call production, regarded it as an act of drawing upon the bounty of the gods. They made, perhaps fortunately, no analysis of factors of production coöperating to turn out a product. Consequently they recognized no necessary connection between the hours of toil and the extent of the product. Their idea appears to have been that the gods, having made their bounty available for the sustenance of mankind, had also in their wisdom so arranged things that man should have to do a little searching and contriving on his own account, lest life become too idle and easy. Now, making all due allowance for the fact that this was only the mythological tradition of a simple agricultural people, there is a germ of truth in it which may fit the *(Continued on page 252)*

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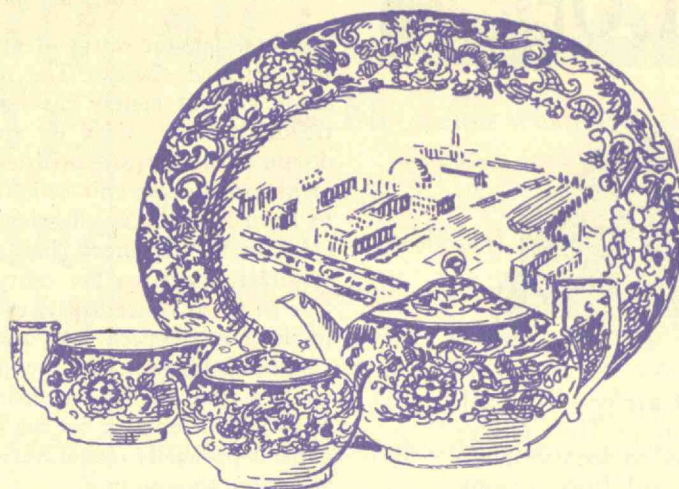
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Conforming to an incessant demand for cups and saucers, plates in other sizes, platters, etc. in dinner ware, to match Technology Plates, we have arranged with Josiah Wedgwood and Sons, Ltd. of Etruria, England, to manufacture these additional items in the Technology border pattern. These items may be had in any combination or quantity, and in blue or mulberry. It has been deemed advisable to use only the border pattern on these dishes with the exception of the platter which has a new and interesting airplane view. A special price of \$5.00 each has been made on the platter. About four months will be required for delivery. The prices are F.O.B. Boston.

Orders for sets of Technology service plates should still be sent to:

THE ALUMNI ASSOCIATION  
Room 3-225, M.I.T.  
Cambridge, Mass.

Staffordshire Blue, \$13.00  
per dozen — two for  
\$25.00

Mulberry, \$15.00 per dozen  
\$4.00 Deposit required on all  
orders



Sirs: Please ship to me on receipt from Wedgwood, the items checked below:

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SHIPPING .....

ADDRESS .....

Check enclosed \$ .....

Ship C.O.D. \$ .....

No. of pieces Ordered	Price	Total Price	Color	
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..... Tea Plates	\$10.00 Dozen	.....	.....	.....
..... Tea cups and saucers	10.50 Dozen	.....	.....	.....
..... Special platter (16" length)	5.00 Each	.....	.....	.....
..... After dinner cups and saucers	10.00 Dozen	.....	.....	.....
..... Cream soup cups and saucers	19.50 Dozen	.....	.....	.....
..... Tea pot serving 6 people	3.50 Each	.....	.....	.....
..... Sugar bowl	3.00 Each	.....	.....	.....
..... Cream pitcher	1.75 Each	.....	.....	.....

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## INVENTION AND ECONOMICS

(Continued from page 250)

present economic status of innovation better than more sophisticated theory. The useful products which we enjoy are not merely the result of so many hours of treadmill labor, aided by appropriate instruments. We do not so much create utilities as draw them up out of an inexhaustible reservoir which we are only now beginning to learn how to tap effectively. Mr. Edison's oft-quoted epigram to the effect that invention is one per cent inspiration and 99 per cent perspiration may be quite true so far as concerns the inventor himself. There is no immediate prospect that work will be abolished. The significant thing is that the final product, in amount and quality, bears no fixed or definite relation to the amount of toil spent upon it by the population as a whole. The game is primarily one of outwitting nature, and the perspiration, though profuse, is after all only incidental.

The main stream of economic thought since the days of Adam Smith has followed a course quite different from that indicated either by the Greek view or by Sir William Petty as I have interpreted his suggestion. The Father of Political Economy was concerned with a different range of problems as a glance into the "Wealth of Nations" will show. He says, for example, "the improved dexterity of a workman may be considered in the same light as a machine or instrument of trade which facilitates and abridges labor, and which, though it costs a certain expense, repays that expense with a profit." Again, supposing the case of a dyer who knows a process which enables him to dye cloth at half the usual cost, "his extraordinary gains arise from the high price which is paid for his private labor," but "they are commonly considered as extraordinary profits of stock. Such enhancements of the market price are evidently the effects of particular accidents, of which, however, the operation may sometimes last for years together."

In these passages art seems reduced to mere manual dexterity, though Petty evidently had in mind some more ample achievement in dealing with a stubborn environment. Again, with the easy advantage of hindsight, it now appears that innovations in technique represent something more than particular accidents. It is hardly gracious to pick flaws in Adam Smith because he could not foresee the course of organized research as we know it today. What the old master was trying to do was to fit into his threefold distribution scheme of wages of labor, rent of land and profits of stock, a phenomenon — innovation — which even in his day was getting to be troublesome. Since then it has proved more and more refractory to economic analysis as the scope and influence of research has widened. Were Adam Smith alive today, he would be casting upon our laboratories that shrewdly philosophic eye which rested (Continued on page 254)

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## INVENTION AND ECONOMICS

(Continued from page 252)

to such good purpose upon an eighteenth century pin factory. Where, in his age, he brought away sound and permanent conclusions regarding the division of labor, he might, in our age, deal as perspicaciously with, let us say, the General Motors Research Corporation. The laboratories are brewing social and economic problems out of technical elements, so that the Adam Smiths of our century will find there plenty of work ready to hand.

The relation of innovation to economic profits is perhaps the most fascinating of all the wide range of topics included under the economics of invention. It can hardly be discussed without reference to the static analysis, with which the economics of the past century has been primarily concerned. In attempting to solve the riddle of how the value of goods and services is ultimately determined, and how the national dividend is distributed, it has become necessary to make increasingly artificial assumptions in order to bring the problem within reach of rigorous logic. Chief among these has been the assumption of a static state of society in which competition works out its effects to equilibrium, unhindered by friction; in which population and habits of consumption remain constant; and in which innovations in the arts of production cease to intrude their disturbing influences. In fact, the phrase "given the state of the industrial arts" runs like a refrain through most of the economic analysis of the past generation. Under these assumptions, the famous "tendency of profits to a minimum" works itself out to completion in such a way that no business man could hope to make more than the wages his services would command in the employ of another.

These highly artificial assumptions have justified themselves in practice by yielding a number of conclusions both interesting and useful. An extensive body of criticism has grown up, however, which takes the view that dynamic influences, of which technical innovation is one, can not fairly be regarded merely as incidental disturbing factors in a theoretical state of equilibrium. They are not, as Adam Smith thought, particular accidents, but organic elements in the social process. According to this view, the static assumption is unreal and violently impractical, even as a tool of analysis. It is as though we should assume that one arm grows while the rest of the body remains unchanged, and should set up on this supposition a system of physiology.

Even on the basis of traditional static assumptions it is possible to account for the existence of profits on the basis of technical innovation. A new element in technique adopted by a business enterprise may serve either to reduce the costs of producing a given product, or give rise to new products which may change the habits of consumers, or it may do both. In either case, a differential advantage accrues to the enterprise at first, as compared with its competitors. This advantage gradually disappears, the rate of its disappearance depending upon the speed with which the new element can be adopted by competitors. Patents and other forms of monopoly tend to delay this process. The high cost of the necessary fixed plant may do likewise. But in spite of such factors as these, there is a strong (Continued on page 256)



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## INVENTION AND ECONOMICS

(Continued from page 254)

tendency for innovations to diffuse themselves rapidly throughout the industrial world, where they become absorbed into the understood, accepted body of technique, and so the competitive equilibrium is restored, unless a fresh improvement appears.

The more skeptical view regards this sort of interruption in the static equilibrium as the normal state of things. The ceaseless round of improvement is conceived as an indispensable part of the industrial world, and the differential advantage which innovation brings to individual businesses is a changing quantity, compounded of individual initiative in promoting innovation, alertness in adopting improved practice available from outside sources as part of the diffusion process, and lastly, the loss by diffusion of original improvements among competitors. Further complexities arise through the fact that loss of an initial advantage through diffusion may be compensated by lower costs in related industries, so that a part of the loss is made up through external economies. To realize how these tendencies operate it is only necessary to pass in review current developments such as talking pictures, petroleum hydrogenation or the progressive cheapening of rubber tires. Against the restrictive influence of patents on the one hand is seen the ever present tendency to diffusion through exchange of trade information, voluntary or involuntary, and through elements of improved engineering practice which can scarcely be prevented from spreading.

This line of thought leads, finally, to a somewhat different view of the traditional rôle of capital in production. The emphasis on material capital goods and fixed plant tends to gloss over the vital elements of knowledge and technique, which, as we have seen, are in a constant state of growth. For example, the enormous investment in fixed plant necessary to produce heavy steel products economically is so striking that it tends to conceal the "vitaminic" elements of metallurgical knowledge which lie at the heart of the whole enterprise. This impressive collection of apparatus is, after all, only the transient embodiment of the intangible element of technique as currently practiced. It is knowledge — physical and chemical — that controls and informs the physical plant. Any chemical engineer knows that a plant is designed around a process. The plant, it might almost be said, *is* the process, bodied and given shape in accordance with such understanding of the nature of the process as the designer has attained. As H. H. Farquhar has put it: "The capital is needed to put knowledge to work and to keep it there; capital without knowledge is likely to disappear quickly in competition with those who possess both. Knowledge without capital is a stronger asset than is capital without knowledge, for knowledge can be capitalized, while capital can not be educated." *Es ist der Geist der sich den Körper baut.*

British observers have attributed much of the success of American industry to its courageous policy of forestalling obsolescence by scrapping equipment still almost new in favor of something better. The frugal European shudders at this waste, yet the practice is only a recogni-

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tion of the fact that outmoded physical equipment is little more than an empty shell from which the soul has fled. The practical financial mind has usually been prone to overestimate the importance of fixed plant, though this is less true now than formerly. A sunk cost is a hard reality from the financial standpoint. It is an investment not lightly to be abandoned. The intangible elements of changing technical knowledge appear abstract and even metaphysical to the hard-headed business man, but obsolescence now takes heavier toll with each succeeding year. It drives home the lesson which the business world is learning: that the progress of technique is the controlling factor, and may wipe out, almost in a night, huge investments which had been looked to as a source of profits for years to come. The industry with costly and elaborate equipment, specialized to produce a given product in a given way, may easily find itself, with the march of change, in the position of *Tyrannosaurus Rex*, largest of the carnivorous dinosaurs, extinct because its massive carcass and none too agile brain could not adapt themselves to changing conditions. In industrial as well as organic evolution, there are blind alleys. The years are strewn with extinct species bearing witness that ceaseless adaptation is the price of survival.

Under conditions approaching monopoly, this process may be hindered or even for a time reversed. The monopolist, threatened financially by the movement of invention, may seek to thwart and repress invention. This opens the whole complex question of patents held out of use, and of tying contracts of various kinds, designed to perpetuate and extend the legitimate monopoly of the patentee. All these expedients may be resorted to in the effort to realize on an investment which has been crystallized into a narrowly specialized plant. A kind of vested interest thus exists, in maintaining the technical *status quo ante*. Under normal competitive conditions, however, aided by the rapid diffusion of technique in the industrial world, they do not avail much nor long. The increasing part which patent cases play in the administration of the anti-trust laws testifies to the importance of innovation as an instrument of industrial monopoly. This is, in fact, one of the economic problems connected with innovation which promises much acute controversy for the near future.

The upshot of these reflections is to point out the need of systematic analysis of the economic effects of innovation. In this brief article I have no more than touched upon a few of the aspects of such a far-reaching problem. It is apparent to any casual observer of contemporary life that innovation is coming to have social and economic effects both grave and, to a large extent, unpredictable. If any degree of prediction or control is to be achieved, it will be done, not by casual observation not by gaping wonderment at the marvels disclosed, but by research on a scientific plane into the economic ramifications of the innovating function. The problem lies squarely in the field of the economist, because all applied science works under economic sanctions and limitations. But the economist will have to acquire the engineering and scientific as well as the financial point of view in order to deal effectively with this ever-growing problem. Present conditions eloquently attest to the need for such economists.

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## A MEMORIAL TO ROGERS

*(Continued from page 245)*

great number of men going out into all parts of the world to make this a better and happier place to live; we, who are Virginians, should remember that the wonderful work was inspired and put into his heart while working here in this University. For in founding M.I.T., I believe he carried with him an endeavor to put into that new work the model of the life and the type of things found at the University of Virginia. . . ."

President Alderman, chief executive of the University of Virginia since 1904 and a contemporary and close friend of Woodrow Wilson, rose to accept the tablet for the University.

" . . . I accept with very sincere gratitude this tablet commemorating the distinguished service and high intellectual equipment of William Barton Rogers . . . perhaps the most distinguished man of pure science ever connected with the life of the University of Virginia . . . who was President, and the only one from the South, of the National Academy of Science. We are very happy, through the wisdom and generosity of the alumni of the Massachusetts Institute of Technology resident in Virginia, to see this tablet take its place under the portrait of this great scientist, whose career here, and at Technology, will be recited to you by men eminent in Dr. Rogers' own field. I extend to you, Mr. Parrish, and to all your colleagues, the deep gratitude of the University of Virginia."

Rogers' second successor in the chair of physics at Virginia was present, to bring before his audience with deft touches a living picture of the man as Virginia had known him. Dr. Hoxton, though but the second physics head since 1853 when Rogers left the University, is still

a young man, for his predecessor was Francis H. Smith who taught with a fire and vigor characteristic of a Rogers for well over half a century and died at the age of 99. Technology men should be interested in a prophecy made by Professor Joseph Henry (henry: unit of inductance), famed Princeton physicist and later secretary of the Smithsonian Institution, who wrote to the University of Virginia on behalf of the youthful Rogers as follows: "Mr. William Rogers, of Virginia, is well known as an ardent and successful cultivator of science. I am personally acquainted with him, and have a very high opinion of his talents and acquirements. He is one of those who, not content with retailing the untested opinions and discoveries of European philosophers, endeavor to enlarge the boundaries of useful knowledge by experiments and observations of his own. Should Mr. Rogers' life and health be spared, I am confident that he will do much towards elevating the scientific character of our country."

One naturally hears so little at the Institute of Rogers, the Virginian, that Dr. Hoxton's exposition, largely based on original sources of data, is of particular interest: " . . . in those days the professor of Natural Philosophy had a wide perspective. He was free to roam at will in the extended fields of chemistry, geology, astronomy, and physics. Rogers left his footprints in each. Today we commemorate a tablet to him in a laboratory of chemistry; in the physical laboratory are to be found his bust, his apparatus cabinet, clock, and other personal instruments; his name is graven upon the Geological building; and a clock from his department is now installed and running in the Astronomical observatory. . . ."

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President Compton in his inaugural address, quoting from Rogers' original plan, made the following comment which the speaker appropriately included: "Dr. Rogers then goes on to outline an organization and a curriculum which are astonishingly like those of today, which have stood the test of time and experience. As an example of constructive imagination, good judgment and prophetic vision, I wonder whether there is an equal to this in educational literature."

Four persons present in the audience attending the dedication exercises had met and known Rogers. Two of them were the son and daughter of Francis H. Smith; a third was Francis Perry Dunnington, distinguished emeritus professor of chemistry. One of these tells, first-hand, of Rogers' own presentation of his scientific masterpiece, the geology of the Appalachian chain: "A grander geological theme could hardly be imagined. It related to the physical structure of a mountain chain 1,300 miles in total length, extending from Vermont to Alabama and 100 miles in greatest breadth, with strata so folded, warped, contorted, fractured and eroded that science had sought in vain to find a key to their original structure. Yet the genius of the brothers Rogers (William and Henry) had, like the Egyptologist with the papyrus roll, unfolded the inverted and contorted strata, spread and smoothed them out, as it were, in an open book, and showed them to the eye of science as originally horizontal deposits, continuous with the rocks of the great western coal fields. . . . The impression I have of this exposition, as delivered, is that it was the most lucid and elegant effort of oral statement to which I ever listened."

Dr. Hoxton testified to Rogers' brilliance and popularity as a lecturer in an account which well deserves space for the sake of its freshness and vivacity alone.

The founder and first president of Technology spoke again through the person of Dr. Stratton, who read as his contribution to the program, what was perhaps the most fitting document that could have been found for the occasion — Rogers' memorial to the Massachusetts Legislature on the plan for a technological institution. Of equal interest were his own remarks, of an introductory or commentary nature: "... the thing that impressed me more than anything else was his prophetic vision and it can only be explained by his experience with all of the Sciences. I mean his vision as to the development of the industries of this country and the part that Sciences play in it . . . he never lost sight of technology in relation to general education . . . he predicted and prescribed what has become our great engineering societies . . . it may be of interest to know that at present it is proposed to establish a technological press for the very purpose this was intended. Our periodical will also carry articles translated from foreign languages. Just at present the Japanese Government has done a great piece of work in earthquakes. They have agreed to publish this work and translate it and turn it over to us for publication. This is a small part of the work predicted by Rogers, but a very important part for us at this time . . . the outline of this proposed museum is really that of the one at Munich. If the Institute had followed Rogers' suggestions, this country would undoubtedly have had the first of its kind. Philadelphia is planning one, also (*Concluded on page 260*)

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## A MEMORIAL TO ROGERS

(Concluded from page 259)

Chicago and New York. It will not be long before the museum will be a part of each great city or community. . . ."

Dr. Stratton emphasized the following paragraph in Rogers' treatise as the most important statement in his argument: ". . . in this division it should be the first object to impart a thorough knowledge of the fundamental principles of the several branches of physics, as mathematically and experimentally demonstrated; and then to conduct the more strictly practical instruction, as much as possible, under the guidance of these primary truths."

Of the 174 Technology men now resident in Virginia, a goodly representation attended these exercises. Familiar figures besides J. Scott Parrish '92, were Don Frazier '11, secretary of the Technology Club, and Al Higgins '01. The local committee consisted of Walter S. Rodman '09, James S. Miller '25, and Lauren B. Hitchcock '20, who functioned under the leadership of Edmund S. Campbell '06, head of the School of Art and Architecture. The four wives constituted a women's committee under the direction of Mrs. Rodman and served tea in the Colonnade Club at the conclusion of the program.

## THE FASTEST TRAINS

(Continued from page 235)

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4. Paris to Calais; Nord, 190 mins. 186 miles

Non-stop portions of the routes of long-distance American and Canadian limiteds as published not long ago in the *Railway Age* yield data which approximates the above times:

1. Valpariso to Ft. Wayne; Pennsylvania's *Steel City Express*; 105 mins. 104.4 miles
2. Brockville to Montreal; Canadian National's *Inter-City Limited*; 125 mins. 125.6 miles
3. Gary to Crestline; Pennsylvania's *Liberty Limited*; 269 mins. 254.4 miles
4. New York Central's *Southwestern Limited*; on three portions of its run: 128.2, 179, and 223.5 miles are covered in 133, 186, and 247 minutes, respectively

Runs of over 500 miles in Europe between metropolitan centers are rare except where one or more international boundaries are crossed. The effect of customs delays at frontiers should, therefore, not be overlooked when contrasting the following data for 18 crack European trains with that shown on pages 236 and 237 for American and Canadian services:

(Figures indicate hours, miles, and miles per hour)

1. London-Wakefield; London and North Eastern; *West Riding Pullman*<sup>1</sup> 3.1 — 176 — 56.8

<sup>1</sup> Non-stop run.

(Concluded on page 262)



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# DIVISION OF INDUSTRIAL COÖPERATION & RESEARCH

MASSACHUSETTS INSTITUTE *of* TECHNOLOGY • CAMBRIDGE

# NEWS FROM THE CLASSES AND CLUBS

1877

It is with regret that the Secretary records the death of William B. Bradford on December 1, 1930, at his home in Somerville, following a few days' illness. He was 74 years of age. Mr. Bradford was born in Dorchester, April 6, 1856, and was a direct descendant of Governor William Bradford, of Pilgrim fame. For 25 years he was a supervising draughtsman at the Boston Navy Yard, being retired at the age of 70. For quite a number of years he taught mechanical drawing in the evening schools of Somerville. He was a member of the Bunker Hill Monument Association, the Middlesex Associates, the Point Shirley Yacht Club, the "A" Republican Club of Boston (an old political organization of historical interest), and St. James' Episcopal Church. He leaves a widow, Mrs. Anita Taft Bradford, two sons, William G. Bradford of Altadena, Calif., and Frank R. Bradford of Sharon, a daughter, Mrs. Grace Bradford Sumner of Somerville, also a brother and sister, George G. Bradford and Miss Mary G. Bradford, both of Cambridge. There are eight grandchildren.

The funeral services were held on Thursday, December 4, at three o'clock, Rev. Ernest M. Paddock of St. James' Episcopal Church, North Cambridge, officiating, and the interment was at Forest Hills Cemetery. — BELVIN T. WILLISTON, *Secretary*, 3 Monmouth Street, Somerville, Mass.

1880

The Secretary of '80 is very sorry that his Class is so seldom represented in Notes from the Classes. He seldom, almost never, hears from or of any member of the Class. Of the graduates only three are still living: Chase, who has been incurably ill for several years; Hamilton, who never writes and who has only been seen once during many years; and the Secretary. Of the Specials who were connected with the Class for one or more years, Benedick was at the graduation exercises last June as were some members of the School of Mechanic Arts with only one of whom was the Secretary acquainted, Mrs. Tead.

In consequence of the above conditions, the Secretary has nothing to write about except his own doings and that he would prefer to leave to others. In order that the Class may occasionally appear he will now state that at the age of 78 years he is still engaged vigorously in active work as for the last 30 years. He is still the director of the Teachers' School of Science, which consists of the four Departments of Botany, Geography, Geology, and Zoölogy. While supervising the whole school he retains as his special work the Department of Geology in

which there are large classes. The teaching all has to be done on Saturdays and evenings as the members of the classes are mostly teachers in active work in their own schools. On each Saturday he lectures four hours, two in the forenoon and two in the afternoon.

In addition to this regular work he has served as a member of various boards of trustees, of councils, of various organizations and so on, and is still active in a few. As one of the founders of the Children's Museum of Boston, he was its first President, has always been on its Board of Trustees, and now has the title of Honorary President. He has one son, Donald C. Barton, a former special student at Tech and a Ph.D. in geology at Harvard, who is now a consultant geophysicist and geologist at Houston, Texas, and who has given special lectures in the Geological Department at Tech. The Secretary has one daughter whose husband is an engineer with Stone and Webster. The latter is a Harvard graduate but also a Technology special. The Secretary has three grandchildren, his son having one daughter and his daughter having two daughters.

Finally, the Secretary would be very glad indeed to hear from anyone who was once connected with the Class of '80 whether in the regular Institute Class or in the School of Mechanic Arts, and he would also be very glad to hear from or see anyone of those who were among his students while he was teaching at Technology. — GEORGE H. BARTON, *Secretary*, 89 Trowbridge Street, Cambridge, Mass.

1884

We all have probably noted with deep regret the decease of our distinguished classmate, General duPont. Resolutions adopted by the Class were sent to the family; the Alumni Council did the same, a copy of which will be found elsewhere in this issue. His biography appeared in *The Review* some years ago and another more recent one is given in the present number. — AUGUSTUS H. GILL, *Secretary*, Room 4-053, M. I. T., Cambridge, Mass.

1888

Frank Ladd, 204-pound guard on the Technology 1888 Intercollegiate championship football team that won from Dartmouth 24 to 15, writing from Denver and recalling the old days at the Institute, says: "I remember many of the things that happened in the Union Grounds where the football games were played, the rough surface of the cinder track which surrounded the playing field and getting punched on the nose by a Tufts man when I was not looking. I will remember him always, as he made over my nose. I am still a football man, my sons were, and I go to watch my grandson play on a Junior High Team. Hanging in

my room is a picture of the Technology 1888 Intercollegiate champions and I wonder how many are still alive. Those I knew intimately are gone. It might be of interest to *The Review* readers to know that I took the State Examination for licensed architects at the age of 60 and passed it on my engineering experience. It took me many years to find out what I should have started with. I now look forward with the enthusiasm of youth to accomplishing something in the new line, as I have a commission to build the largest building ever erected west of Chicago." This certainly is a remarkable achievement for a man who graduated in Civil Engineering 42 years ago. Of the '88 Championship Team, Dick Devens, Ned Herrick, Jack Ray, and Clarence Vorce have passed away, but Frank Ladd, Fred Ellis, Billy Dearborn, Odin Roberts, and "Oliver" Cromwell are still carrying on.

William Besler, Chairman of the Board of the Central Railroad Company of New Jersey, and well known orator of the Class of '88, responded nobly to the call of your Secretary with the following interesting account of his trip from San Francisco to Seattle last summer: "Last July, Mrs. Besler and myself took a trip by automobile from San Francisco to Seattle and return. We drove over the new Redwood Trail, which traverses that wonderful section of Northwestern California, and through the beautiful redwood groves, some of which are still left. Picture, if you can, a new concrete road winding and twisting through giant trees, many of which are estimated at over 3,000 years old. The Redwood Trail lies generally 30 to 50 miles or more back from the Pacific Ocean, but toward the northerly portion, it comes out onto the shore of the ocean itself. Sometimes along the shore, but a few yards from the water, at other times climbing high up, winding sharply with hairpin curves back and forth until it reaches a view of unsurpassed splendor on some high promontory, directly above the ocean.

"At one of these points, about 1,800 or 2,000 feet, directly above and almost perpendicular to the Pacific Ocean, with high waves dashing at its base, we drew up our automobile to a parking space with a railing of huge logs laid at its edge, and we were looking out upon the Pacific with the next stopping place thereon Japan. While I was standing there, an automobile drew up beside me and as I turned to go back to my car, a gentleman in the auto opened the door and beckoned me to come to him. Thinking it was some stranger who wanted some information, I advanced and as I reached the door, a hand was put out and a voice said 'I am Keough,' followed by the remark, 'I would know a man from Technology whether standing with his back to me gazing at the Pacific Ocean or



1888 Continued

down in Copley Square.' He introduced Mrs. Keough who was with him and I called to Mrs. Besler to come over to meet them, and we had a most enjoyable visit. He told me that he had left Boston in June and had driven through to this point, the farthest into the Pacific Ocean of any of the Pacific coast line of the United States. He was headed south through the best part of the redwoods, which we had just passed, and I told him to be sure and see the largest one of the group, a tree 32 feet in diameter, and 362 feet high, which was estimated to contain a million board feet of lumber, or enough to build 40 bungalows of eight rooms each. It surely was fine to meet Mr. and Mrs. Keough and to any of our classmates who are so inclined and have the time to do so, I most strongly recommend the trip which we made from San Francisco to Seattle and return."

Wilson Parker writes: "Replying to your request for news for The Review, I can only say I am still practicing architecture and in these days endeavoring to keep one step ahead of the sheriff. We maintain our Indiana Technology Association and at most of our dinners have Technology men come over from Purdue, Dean Potter and his gang, to augment our own crowd which has suffered of late by the loss of nearly 20 men, by deaths and removals. For the last few years I have been engaged in library, school, and institutional work, churches, and so on, built a good house for myself and another to sell, which efforts precluded any vacations, though my car mileage has increased by trips to adjacent states on supervision visits. If I can sell my house, I hope to attend the next Reunion."

We were not surprised to learn that Mrs. Edwin S. Webster of Hammond Street, Chestnut Hill, was elected President of the Garden Club Federation of Massachusetts in view of the personally conducted tour of her gardens by Ned Webster, which was enjoyed by 26 of our Class just before our last Class Banquet in June. — Arthur Williams and Mrs. Williams enjoyed a trip to the Pacific Coast last summer returning through the Canadian Rockies. — Knowing Wilson's architectural ability as well as your Secretary does, he has placed his name at the head of the list of those who will attend our 45th Reunion in 1933.

Sanford Thompson of the Thompson & Lichtner Company, Inc., Engineers, Boston, gave a talk recently before the Rotary Club of Nashua, N. H., on the topic of "Business Tendencies in Europe and America" drawing for this upon his observations and conferences on a recent European trip. He also reports that his company, whose business it seems to be is to help the other fellow to make more money, has had a larger volume of business in 1930 than ever before. They have been carrying on this past summer, in addition to their regular consulting practice in management, a very interesting preliminary research on distribution for the Twentieth Century Fund, Inc. This Fund was founded by Edward A. Filene of Boston for the improvement of eco-

nomie, industrial, civic, and educational conditions by helping to bring about such economic conditions as will tend ultimately to eliminate poverty. — Ellison Means of Ashland, Ky., in reply to your Secretary's questions, states that he never saw a Kentucky Derby, has been Chairman of the Water Commission of that city for the past ten years, has three grandchildren, a golf handicap of 17, and a "short rod casting for bass" handicap of three. This gives a perfect up-to-date picture of Means.

Minturn Wright of Philadelphia answers your Secretary's questions in the following happy manner: "As to 'family, weddings, births, and so on,' these are too numerous with us to enlarge upon. A year ago, however, Mrs. Wright and I did have a most wonderfully interesting trip, going from Vancouver straight through to Hongkong and Canton, and thence working north to Shanghai, Tientsin, and Peiping, followed by about five weeks in Japan. Our experiences were too varied to recite, but of outstanding interest was our participation as 'observers' only, in the conference and deliberations of the meeting of the Institute of Pacific Relations at Kyoto. The members of this group are doing wonderful work in a non-official way in advancing cordial relations between the nations bordering on the Pacific. I, too, am looking forward to our Forty-Fifth Reunion and likewise, as I believe I committed myself, to each of the following ten reunions."

Your Secretary has received from President "Alfred" a clipping showing Powder Point Hotel, Duxbury, Mass., where we celebrated our Thirtieth and Thirty-Fifth Reunions, with the inscription "We won't go there any more." The reason for this is that the hotel has just been sold to the National Sailors' Home and will be occupied by Naval Veterans hereafter, but this might not prevent some of us from going there at some time in the future. We certainly enjoyed those Duxbury Reunions.

Adelbert Mead, the only man in our Class who has preserved his youthful figure so that his freshman drill jacket fits him just as it did 45 years ago, dashed off a thrilling story of his life and travels, as requested by your Secretary, as follows: Born in the year we were all born in, 1866, he prepared for Technology at Chauncy Hall School in Copley Square in the same class as Bradlee, Runkle, Webster, and Wood, and after studying mechanical engineering entered the business established by his father and uncles nearly 100 years ago and extending over the entire eastern part of the United States and several foreign countries. Mead was married in 1889 and has three sons, two daughters and four grandchildren (possibly a Class Record). He retired from business three years ago and since then, with Mrs. Mead and their two daughters, has spent two winters in California and made an ocean voyage to Cuba and through the Panama Canal to Honolulu. Last spring and summer they spent three months in England and on the

continent. Mead says he did not see the moving pictures taken by Walter Shaw at our Fortieth Reunion at Chebeague Island, which prompts your Secretary to suggest that Walter take more movies at our Forty-Fifth and as an added attraction show those he made at our Fortieth wherein Mead stood out as the Commander of the Military Forces of the Class of '88. — Eugene Daniell of Portsmouth, N. H., whom we all remember as representing the Class in the "Fistic art" at the athletic meets during our freshman year, reports that he has followed the family trade of paper manufacture all his life and that his eldest son is following in his footsteps. He has three sons and one daughter, and has done considerable traveling recently.

Addison Nickerson of Beachwood, N. J., writes: "Since 1914 I have been engaged in real estate promotion, development and sale, with my home at Beachwood. In the meantime during the World War, 1918 and 1919, I was located at Camp Eustis, near Norfolk, Va., in the Constructing Quartermaster's Department, Coast Artillery Division, as Superintendent in charge of the procurement department. The winter of 1925-26 I spent in Florida, to my sorrow generally as I got caught in the real estate slump. There have been no more births nor weddings in my family. I lost my oldest son in California in 1912 and have only one son left. My travel and sport is limited to occasional short auto trips to points of interest in this country or to family reunions, as is the old New England custom, on Thanksgiving and Christmas. The hardest exercise I now indulge in is getting up of a morning." We are glad to hear from Nickerson who was one of our best performers on the parallel bars, flying rings and other gymnastic apparatus in the old Exeter Street gymnasium during our freshman year.

It is our sad duty to record the death of James Clarke Tileston Baldwin on December 20, 1930, at his Chestnut Hill home. Jimmie, as we all loved to call him, was one of the most ardent supporters of the famous Class of '98, as he always called it, and could always be counted on to be present and do his part at every Class affair. He was one of our best performers on the piano at our meetings at the Old Parker House in the middle eighties and retained "that school girl complexion" till late in life. He held responsible positions with the telephone companies in New York, Chicago, St. Louis and Boston from the time of his graduation till about the time of the World War when he was actively engaged in Red Cross work in Boston. Later he was associated with the publishing firm of Marshall Jones Company, Boston. He was an active member and officer of the Chestnut Hill Golf Club for nearly 30 years and also a member of the St. Botolph Club. He leaves a widow, Mrs. Alice C. S. Baldwin, a daughter Miss Louise C. Baldwin and a son James T. Baldwin.

Another member of the Class has also recently passed away, Harvey G. Woodward, on November 18, 1930, in Birming-

1888 Continued

ham, Ala. We have received no details except that he had not been in particularly good health for some time. Woodward contemplated the establishment of an extensive educational institution in the South and one of his associates has promised us a synopsis of the plans as soon as they are ready to be made public.

Your Secretary thinks he remembers Annie Sabine (Siebert) as a dark eyed slender slip of a girl as she worked in the Physical Laboratories in '87 and '88. He may be wrong; but he has received a very artistic reply to his request for personal news as follows: "You ask for something from the past since the Eighties — a long time to account for. After leaving Technology I began the study of art and worked with a well known artist in Boston and in later years with Charles W. Hawthorne of New York. We have raised two children, and work has been a joy. Portrait painting has been my avocation and still is. The laboratory test of the strength of materials and the romance of higher mathematics have been given over for the study of the beauty of things as I see them. A new art and a new physics open unexplored vistas — and time itself is fleeting."

Recently, your Secretary made a trip to Chebeague Island, Maine, where 31 members of the Class held their Fortieth Reunion in June, 1928, for the purpose of inspecting the extensions to the golf course and additions to the club house of the Great Chebeague Golf Club. — The Annual Alumni Dinner which is to be held at the Hotel Statler on February 28 will furnish an opportunity for all '88 men present to tell the Secretary all the news about themselves and any other men they happen to hear about. Any men who read this and find that they cannot be present at the dinner will do a great favor to the Secretary if they will "dash off something on the spur of the moment" and send it in for the next issue. — **BERTRAND R. T. COLLINS, Secretary**, 18 Athelstane Road, Newton Centre, Mass.

## 1890

Charles F. Koch of Cincinnati was stung \$50.00 by a so-called son of your Secretary who never existed. A very plausible story was told and one for which any of us would have fallen. Another victim of the unknown son of your Secretary has turned up and Jim Clark of Louisville, Ky., proved to be the one. Jim got stung for \$25.00. I trust no more of you will contribute to the support of this questionable son.

In December Pierre S. duPont contributed \$10,000 to the city of Wilmington, Del., to give as many men employment about the city as possible during the winter. He has also been elected a director of the Pennsylvania Railroad, so he will probably have to join the Union before he can drive a locomotive. — Charles Hayden has become a director of the American Woolen Company. Perhaps at our next Reunion Charlie will tell us how he runs a woolen loom.

Professor William Z. Ripley says in a recent magazine article that railroads must be allowed to consolidate if they are going to survive. So far little or no consolidation has taken place. — The National Council for Intellectual Cooperation (of 55 members and of which the Secretary of Interior, Ray Lyman Wilbur, is Chairman) includes Calvin W. Rice, Secretary of the American Society of Mechanical Engineers, and President Compton. — The engagement is announced of Darragh de Lancey, son of our own Darragh, to Miss Elise P. Gregg of Waterbury, Conn. Darragh, Jr., is a graduate of the Taft School and of Princeton University '28, and is now in his second year at the Yale Law School. — **GEORGE L. GILMORE, Secretary**, 57 Hancock Street, Lexington, Mass.

## 1894

Mrs. de Lancey and her husband have returned to their home in Waterbury after another jaunt among the interesting and unusual corners of Europe. If they ever could be induced to write up the story of their travels on their various journeys it would be a most interesting and instructive chronicle and it would serve as an admirable guide to others who might equally enjoy such intimate glimpses of out of the way places as they seem always to obtain. — **F. A. Schiertz** has recently changed his base of operations from the Pittsburgh district to Jersey City. His present address is 115 Highland Avenue, Jersey City, and he now occupies the post of chief metallurgical chemist, Port of New York Authority.

William M. Wheildon has also recently made known his whereabouts, and is located in the technical department of the Angier Corporation at Framingham, Mass. Billy's son, W. M., Jr., graduated from the Institute last year, and is now a graduate student in the Department of Mechanical Engineering. His name should have been added to the list of sons of '94 men in an earlier issue of notes. — Just after the last batch of notes were sent to *The Review* in October, cards were received announcing the marriage of Frederick E. Fowle to Miss Juliana Tomasson of Washington. Fowle is still at the Astrophysical Observatory in Washington, where he has been ever since graduation, and the list of scientific publications to which his name is attached is a long and distinguished one. It is a matter of great Class pride that he and Abbot have had so large a share in maintaining the work of this Observatory at its very high level. Fowle's home is at 2919 Q Street, N. W., where he and Mrs. Fowle are now "at home" to friends and classmates.

Another October wedding of interest to '94 is that of Wentworth D. Taber, son of our classmate George A. Taber and Miss Faith Wells. The wedding took place at Riverhead, L. I. Mr. Taber is a graduate of Technology in the Class of 1928. — **SAMUEL C. PRESCOTT, Secretary**, Room 10-405, M. I. T., Cambridge, Mass.

## 1895

An all-around '95 man should keep in mind three things. First, to know that he is receiving his copy of *The Review*, because there is no better publication of its kind. Second, he should take the time to completely read it. Third, he should remember that the Class Notes are an important part of the issue and that secretaries require news material. Wake up '95 and do your bit! Your secretaries will bless you.

Our ranks have again been reduced by the sudden passing on of Frederick A. Hannah. In the January Review we gladly announced his recent return from Russia and furnished an account of his travel and experience. In this issue we sadly record his sudden death in New York City, on Friday evening, December 5.

Fred's condition physically was none too good during his last visit to Boston, as he had been suffering from an attack of neuritis and felt the strain of talking at our luncheon and before the members of the Alumni Council at Walker Memorial on Monday, November 24. However, he appeared to master the conditions and returned to New York, but apparently the neuritis attacked his heart and he passed away suddenly. He was most active in his profession, a most generous giver of his time and means to everything in which he was interested (especially towards the Class of '95) and a loving friend and splendid counselor; all these and more we shall miss and deeply mourn our loss. Services were held in New York City and in Lexington, Mass., and interment was in the Woodlawn Cemetery, Everett, Mass.

On July 13, 1927, Frederick A. Hannah was married to Ruth Anne Judkins who survives him. His professional and social organizations included American Society of Mechanical Engineers, Engineers Club of New York, Old Colony Club, Boston City Club, and the Engineers Club of Boston. During the years 1895 to 1900, he was an instructor at Technology, Boston, and at the Polytechnic Institute, Brooklyn. From 1901 to 1903 he designed special machinery. His factory experience covered two years with the Crosby Steam Gage and Valve Company, Boston. In 1906 he was associated with Stephen T. Williams, New York City, in industrial engineering. From 1911 on he followed this work individually and had business connections with a score of manufacturing establishments from New York to Montana and from Canada to Kentucky.

In this untimely passing Fred's friends and close acquaintances will always remember him for his characteristic earnestness, his unfailing sunny humor, and his benign outlook on life. He always sought the best in his fellow men and there never appeared a spark of cynicism in his nature. His life, his work, his complete devotion to all who were privileged to know him — this is his reward and our blessed memory.

The Class of '95 was well represented at the dinner given to President Compton in New York City last December. Our



1895 Continued

beloved Jerry Swope eclipsed all of his past records when he delivered the remarkable introductory address. Mr. and Mrs. John Moore, Mr. and Mrs. Frank Park, Mr. and Mrs. John J. Wolfe, Fred Cutter, John H. Gardiner, and others attended.

We quote from the *Electrical World* of December 13, referring to an address by Gerard Swope, President of the General Electric Company, before the American Academy of Political and Social Science in Philadelphia, Pa. "The responsibility resting on industrial leaders in the United States of providing economic security for workers in the present crisis was emphasized by Gerard Swope, President of the General Electric Company, this week. The occasion was an address before a conference of business executives, economists, labor leaders, social workers, and others held in Philadelphia under the auspices of the American Academy of Political and Social Science. 'Five years ago,' said Mr. Swope, 'when I suggested an unemployment insurance plan to the workers of the General Electric Company, the country was prospering and they were not interested. Four months ago I again suggested a plan and they were all interested. On December first we declared this plan in effect on an emergency call and we have a tremendous sum on which the workers may draw when needed. All contribute 1 per cent of their earnings to this emergency type of insurance.'" — LUTHER K. YODER, *Secretary*, Chandler Machine Company, Ayer, Mass. JOHN H. GARDINER, *Assistant Secretary*, Graybar Electric Company, 420 Lexington Avenue, New York, N. Y.

## 1896

The secretaries have both received cards from Mark Allen in London, where he said he was dodging the pea soup fogs and sent regards to all the boys. — Rockwell saw young Edwin Palmer going past the house one day in December and was impressed with the improvement that the lad had made in walking.

Charlie Lawrence attended the dinner of the New York Technology Club on December 8, in honor of Dr. Compton and Dr. Stratton. He reported that it was a very fine occasion. He regretted very much, however, that he was the only representative of the '96 Class present, and felt that a lot of the fellows missed a good opportunity to get together and to hear the new president. Perhaps the explanation of the absence of any other '96 men at this dinner is that they are all saving their pennies in order to be present at the Class Reunion next June.

Lucius Tyler has announced that he is going to be present on that occasion if he is alive, and wants to see some other fellows there whom he has not seen for years. He is, therefore, going to get out letters to such men. It is suggested that this would be a splendid example for other fellows to follow. The reunions are the biggest events for our class as a whole. We think of one another and wish that we could see one another more often.

To men who have not appeared regularly at the reunions we would urge especially that you make an effort to come next June and give your old classmates a chance to see you and talk with you. If there are men whom you would like especially to see there, it is not too early for you to get off some letters as Tyler is doing to these fellows.

The success of the first edition of Bradley Stoughton's book on "Metallurgical Engineering" was so great that he has had to prepare a second edition, which is now out, and which gave him an opportunity to bring the book up to date. — A newspaper report recently was to the effect that Partridge had given up his pastorate at St. Ann's Episcopal Church in Dorchester and was going south for a good rest.

Another item from the Boston papers concerned our classmate Joseph L. Sturtevant and his suit against Henry Ford over the diversion of the water of a brook which passes through Sturtevant's summer place, Brookledge, adjoining Ford's Wayside Inn property in Sudbury. This brook flows through both the Sturtevant and Ford estates, and by the erection of mills and dams Ford reduced the flow about 50% when it reached Brookledge, and thus interfered with plans which Sturtevant had made for improving his property. The case had been previously heard by a Master, who found that Sturtevant was entitled to damages of \$10,000 and also injunctive relief. Mr. Ford appealed to the Middlesex Superior Court on exceptions, and this Court confirmed the decision of the Master and recommitment the case to the Master for further hearing to straighten out some details.

The sympathy of the entire class will go out to Billy McAlpine on the loss of his wife in November.

There have been no further victims among '96 men of the slick swindler, previously reported, who poses as the son of a classmate and asks for financial aid, but Wayne from Indianapolis has added the information that this man does not confine himself entirely to '96 men as he got a doctor in Indianapolis for \$20.00 and one of the professors of the Indiana University at Bloomington. He always tells the automobile accident story. The description from Indiana does not tally with that given by '96 men elsewhere. Wayne says that the fellow is well built, not tall, especially finely dressed, wears a fraternity key and has a fraternity pin on his vest also. He looks and speaks like a thorough gentleman and says that he is at medical school or at a hospital. He prepares himself in advance so that when he approaches a man he is able to answer questions fully and satisfy his victim that he is what he reports himself to be. The fact that descriptions vary from different parts of the country may indicate that there is a regular organization of swindlers who are carrying on the same method in different localities. The *Dartmouth Alumni Magazine* reports that Dartmouth men have been touched quite widely. — CHARLES E. LOCKE, *Secretary*, Room 8-109,

M. I. T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

## 1899

Everett H. Hinckley writes me from Marmaroneck, N. Y., that he supposes there really are some '99 men who would like to know where "Old Hunkens" is. After ten years voyaging, details of which we can get from Willie Nathan, Hinckley landed at New Bedford in charge of the chemistry and dyeing department of the New Bedford Textile School. During the next ten years in this position he found out how Tech instructors in the chemical laboratory knew so much, but he is not telling the rising generation. At the end of the war he made another change and has spent the last decade making the world turn easier by selling lubricating oils thereby benefiting the world and himself. Now two of his boys have grown up and are in business on their own; one is graduating from New Hampshire State University in January, and his twin brother from North Carolina State at the same time. One of his daughters is in Meredith College, one is graduating from High school, and one has just entered. Everett will spend Christmas in North Carolina, and New Year's in New York. In addition to the amusement of rearing his family, Hinckley has boated and motored and kept in touch with his friends. He has not yet reached the age of or for golf. The scene closes for the time being at Marmaroneck, and he wishes us all a happy New Year.

Lew Emery is staying at the Lombardy in New York City. He shall not escape me on my next visit to New York and I shall try to get some details of his trip through Zagreb, Belgrade, Bucarest, and Constantinople. — Albert Nathan and Robert S. Blair have greatly improved their chess. A while back they discovered that both had been on the Tech Chess Team so they went up to Nathan's camp to settle the matter. There was some delay in getting the pieces set up, occasioned by argument as to where they belonged. After some preliminaries they mutually agreed that each party had a right to take any move back at any time he could remember the preceding layout. It took them three days to play three games. The one Nathan won was a wonder. The other two were punk. Blair only won them on flukes! Nathan closed with the comment that there wasn't any other news unless "you count the times my secretary volunteers information about my bank balance." What the information was Nathan didn't say, but as other secretaries are volunteering information, one can guess.

Etheredge Walker called on me while I was out of town and he probably will go north as George Priest did, and tell the world that I am always out of town. This is not true, and I am in town at this writing, and if I can find Walker at the Powhatan Hotel where he was staying — I know because he mailed his dues from there — I may be able to get some news from him. — W. MALCOLM CORSE, *Secretary*,



810 18th Street, Washington, D. C.  
 ARTHUR H. BROWN, *Assistant Secretary*,  
 53 State Street, Boston, Mass.

## 1900

Crowell, looking as rosy as ever, came in recently and among other items gave out that he had received a call from Mr. and Mrs. Wastcoat recently while they were touring the Cape. Crowell always was a lucky fellow. — Pickersgill, I, called in to say that he had met John Campbell, III, while in Harrisburg, Pa., and that he was President and General Manager of the Harrisburg Manufacturing and Boiler Company, 19th and Derry Streets, and wanted to be remembered to all his old friends. This is indeed welcome news as Campbell was in the list of unknowns. Gradually said list becomes less and less.

Jim Batcheller writes in as follows: "I know apologies and explanations for delayed fulfillment of obligations are unsatisfactory, but nevertheless conventional courtesy dictates I should offer mine to you for having been so long in carrying out my promise to give you some ammunition with which to shoot in your editorial news duties as '00 Class Secretary. Although I have been home a little over a month, I really and truly have been busy with an accumulation of three months' work while away from home, plus current work on my return. I regret I did not have time to get in to lunch with you before I started west on September 28 but the 24 days I spent in Massachusetts were about the busiest of the entire 94 days I was on my journey, for I had to tend to many personal and family matters that could be done only while personally present.

"I find it difficult to decide what to write you that would not bore you or my other former classmates. This was my fourth and longest trans-continental round trip by motor, and I made it the occasion of the celebration of the twenty-fifth wedding anniversary of Mrs. Batcheller and myself, as well as an opportunity to visit many mining camps. My purpose for visiting the latter was twofold: first to see a number of old friends of my unregenerate commercial mining days, before I withdrew to take up mining school work, and second, to study improvements as well as newly developed mining methods for surface and underground excavations. It is necessary to go into the mines to get this last information, for it cannot be found in any laboratories and printed literature cannot give proper descriptions. I also visited a number of institutions where there were either mining departments or Schools of Mining to meet their faculties and discuss matters of common interest.

"I will give you an outline of my route and some of the technical figures so you will better understand my difficulty in deciding what to write. We started August 5 going eastward in Oregon over the wonder McKenzie Pass through the Cascade Range to the new Owyhee Dam in the eastern part of the State, thence up through Idaho over U. S. road No. 95

into British Columbia to Vermillion Pass across the Canadian Rockies to Yoho and Lake Louise. All in all, I believe this is one of the most spectacular bits of mountain road in the west, as it skirts along so close to the west side of the Rocky Mountains. Thence we went south to Butte, Mont., via Glacier National Park, and then eastward to Saulte Ste. Marie where we crossed over again into Canada.

"We drove way down the Saint Lawrence to Quebec, then turned southward through Vermont and New Hampshire to our family summer home at Mattapoisett, Mass. It was a 6,080 mile jaunt of 30 calendar days. Except for some newly opened up stretches of road west of the mountains in B. C. and some roads under improvement in Montana (not to exceed all told 300 miles) the conditions were good enough for 40 miles per hour speed (sometimes more) almost everywhere. All this does not include stops for many underground trips and so on. However, you can see from the average of 202.6 miles per calendar day we did not dawdle along once we were moving on the open road.

"Unlike previous trips, when we had our boys with us, we did no camping whatever, but used hotels and restaurants to save time. It was a shock to find how expensive gas, oil, and cigarettes are across the line to the north. All our standard brands of 'fags' are 35 to 40c per package; even English brands are high, too. I had to pay 40c per gallon for gasoline in some places and usually \$2.00 per gallon for good oil. Hotel prices are high, too, though I sometimes wondered if I was not spotted as a tourist from the States and 'stung' accordingly.

"On our west bound trip, we had a delightful two-day visit with Bob and Mrs. Leach in their beautiful home in Fairfield, Conn. He is busy now as General Manager of the firm of Handy and Harman, Bridgeport, Conn., metallurgists and dealers in precious and rare metals. They handle about 90% of all the sterling silver bullion that moves in North America. His family of beautiful daughters is scattered at present by marriage, work and college.

"Our road south westward took us through the Holland Tunnel from New York into New Jersey and I recommend it to all. The ventilation is so efficient that I believe the air is freer from smells and fumes therein than following the average car at close range on the street. To us, our two day visit at Annapolis, Md., was especially interesting. Our oldest son is at the U. S. Naval Academy and the activities, drill, football, and so on, of the midshipmen are fascinating to watch.

While there we visited Phillip B. Cooper, President of the Class in our freshman year, and Mrs. Cooper. I had been an usher at his wedding in 1899 but had not seen him since. He is looking well and prosperous, grayer (as I am too) and inclined to stoutness. His children are all grown up and he boasts of being a grandfather!

"Going on our way, we enjoyed the Shenandoah Valley and Eastern Tennessee mountains with the beginnings of their wonderful fall foliage colors. Western Tennessee, Arkansas, and all but the western end of Texas were uninterestingly flat, hot, and monotonous with continuous cotton fields. At El Paso, Texas, we attended a three day convention of the American Institute of Mining and Metallurgical Engineers. Many delightful dinners, luncheons, and excursions were provided for the visitors, including trips into the wet district south of the Rio Grande.

"We spent about two weeks visiting many famous mines and places in southern New Mexico and central Arizona, but it was uncomfortably warm. (The natives claimed it was unseasonably hot for October. I guess I am a Jonah, for the weather is invariably abnormal whenever I am visiting any new place.) We would not care for the S. W. as a place for permanent residence. Our home route took us north westward through the Imperial Valley to Los Angeles, thence northward through California over U. S. Road No. 99 all the way to Corvallis. We were 40 days en route home over 5,800 miles. I was surprised to find it 280 miles shorter than my eastbound trip though the east route was admittedly full of detours and crooks from the normal, great circle course.

"Counting the 920 miles driven in and around Boston, my total for the 94 days away from here was 12,800 miles, about half the way around the world. This may help explain how and why we were genuinely tired on arriving here. The other technical figures may be of interest. My car averaged 112 miles per quart of oil and 15.7 miles per gallon of gasoline. This was low due to so much jitney driving in Massachusetts; on the 11,880 miles of east and west driving, it averaged 16.1 miles per gallon; for two passengers with all our luggage, ore specimens, my mining outfit, and so on. I used a Dodge six cylinder (Victory) coupé, and had only one annoying bit of mechanical trouble. On a level road I discovered a rattle in my gear box, which proved to be due to a chipped ball in a shaft bearing that had to be replaced. I had no accidents of moment, though in the slippery mud of a Texas detour another car slid into the left rear mudguard and dented that, and about five blocks from home here in Corvallis on November 6, a parked car darted out without signal just in time to dent my right rear mudguard. Counting in all the gas, oil, grease, repairs, fender work, and estimating the tire depreciation and replacements combined, the total operating cost was between 2.5 and 2.6 cents per mile (no wonder the R. R.'s find it hard to compete with automobiles)."

The Bowditch family has been interested in the revolution in Peru as Samuel, our oldest boy, is with the Cerro de Pasco Copper Corporation as a geologist. Shortly after the revolution a mob of the Peruvian employees attacked the camp of Cerro de Pasco and drove out all

## 1900 Continued

the foreign employees, injured one man very severely, and looted and wrecked many of the houses. Troops were sent and after two days order was restored and these employees went back. Fortunately, Samuel found all his belongings unharmed but some of the married men found their furniture destroyed and houses plundered.

Just to keep the Bowditch family in the limelight, our Charles, on account of an overheated stove, burned up his tent where he is at school in Arizona and lost most of his belongings. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

## 1901

It is probably an entirely fortuitous circumstance, but on the eve of every holiday I seem to find myself sitting down to write a Class letter. This may be an overstatement and derived from a pessimism bred with battling the Christmas crowds in which the alleged gentler sex prove conclusively the justice of the acid characterization first voiced by Rudyard Kipling. In these days of slim figures, natural or acquired, the female elbow lightly clad is a dread weapon particularly when driven rib-ward with the fell malevolence arising from what is known as the maternal instinct. When to this predatory exhibition is added a horde of dirty, sticky children filled with a mania of unbridled and demonstrative affection for the total stranger, a slightly jaundiced outlook on life is permissible. This is not the result of agoraphobia. But anyhow it is Christmas Eve and I am singing my little Christmas carol.

We had a meeting of the Class last week and have settled on Oyster Harbors as the site of our Thirtieth Reunion. This is subject to a proviso, namely, that we can adjust the wife question. As I have canvassed the Class at large, I find that the majority of the men feel that our proposed program of golf, bridge, food, and dreamless slumber offers a rather Lenten repast to the feminine contingent. Further, the wives lack that common bond of association which is our proud birthright from our Alma Mater. In fact the only least common denominator is that so many of them have made unfortunate marriages. But that, of course, they cannot discuss with any degree of freedom in the presence of the party of the first part. So we are planning to transform Oyster Harbors into an Eveless Eden provided we can persuade the genial manager that we have no fell and ulterior motive. He has a yen for wives — it recurs in all of our correspondence even though he failed to respond to my helpful suggestion that I would borrow one — but with the valid facts which can be placed before him, I hope to secure a favorable decision in conformity with the wishes of the Class. This is one of the rare instances where I am privileged to maintain an Olympian impartiality though Johnny McGann — no relative by the way of the militant Dolly and that exemplary helpmate whose place is in the home — prophesies gloomily as to

my future. I refuse to be downcast, however, for I firmly believe that the fair young girl of today is far too sophisticated to let an old fellow like me bring sorrow into her sunny life. In their strength they are merciful.

But I suppose the Editor will resent it if I try to nick The Review further for free advertising for the Reunion. I hope you are all coming though, and I am writing you a long letter in the course of a few days to tell you all about it. I shall also include a post-card on which you may indicate your intention by that simple chirographic device used by the illiterate. I hope some of you will make your mark and then perform the Herculean task of persuading your secretary to mail the post-card. Yes, Mr. Editor, I have almost finished. Forgive me for having trespassed upon your generosity so far.

Now for one bit of genuine news. Arthur Hayden came over to Boston a few days ago to give a talk to the civil engineers — who in my experience are usually misnamed — on "what every young bridge builder should know." Arthur and his associates have developed a new type of bridge structure for short spans, and a descriptive monograph is in press at the present time. The Mt. Pleasant bridge, which is one of this type, was awarded the first prize by the American Institute for Steel Construction as the most beautiful short span bridge built in 1930. I am particularly glad that Arthur is going to be present at the Reunion, for as nearly as I can gather from the facts, Oyster Harbors is on an island or something that approaches it and we may need his services professionally before the party is over. I am sorry. I won't mention the matter again.

This is going to be a short letter. Christmas draws on apace and I must put on some more embrocation and get fresh bandages to cover the ravages of the last three days of contact with what a well-known Chicago lady used to designate as the *boi canaille*. So I wish you all a very Merry Christmas even though you will not know of my benevolent intentions for another month or two, and say good night. Making due allowance for passage of time, you either are or are about to be busily engaged in preparing a Christmas tree for the little hostages to fortune which have enriched your domestic circle. That is to say you are doing it for all of them who are not yet old enough to go out and make whoopee for themselves. So in the cloying atmosphere of the hearth I leave you to seek my lonely abode, unblest by wife or child. But this sentiment is unmanly. Bless you all unto the third and fourth generation, the arrival of which latter is already being presaged by some of the more ostentatious. — ALLAN W. ROWE, *Secretary*, 4 Newbury Street, Boston, Mass.

## 1904

For the past three months Mrs. Stevens, or as some of the boys like to call her, the "real Secretary of the Class," has

been confined to her home with a serious illness. During this time she has received many flowers from the Class and she takes this opportunity of expressing to you all her hearty appreciation of your thoughtfulness. [While these notes were at the printer's we received word of the untimely death of Mrs. Stevens on January 1. — THE EDITOR.]

Under date of December 13, Bill Evans wrote the following description of the Class of '04's participation at the New York Annual Alumni Dinner. He does not state the date of the dinner and I do not know what the date was; Bill's report, however, is a good one and is given verbatim. "I must not let this week-end pass without giving you a report on the Class of '04 at the New York Annual Dinner. Do not get excited by expecting too much for we were only a modest six in number and two of us were reinforced by our wives and Selby Haar had his sister along. We made up, as you will see by actual count, a table of nine, just a comfortable fit at a table set for ten. They were the same crew that I have failed to report to you in previous years, except that we missed Chace, Easterbrooks, Elwell, Nelson, Rupf, and Whitaker, who in the past, helped to make our party one of some size and importance. That was especially true of Carll Chace. I mention their names now in hopes that you will list them as absentees in The Technology Review, so they will see their names in print, and feel condemned for passing us up this year. They missed the best dinner we have had in New York for years. The crowd was sizable, the meal excellent and the entertainment good.

"Here is the roll call to which 'present and accounted for' was the response: Walter Gill, Selby and Miss Haar, Mr. and Mrs. Leon H. Smith, Mr. and Mrs. William A. Evans, Reg Wentworth, and Wilbur T. Wilson. All were able to crack a smile and eat a good meal. No one looked (except I suspect Haar) as if he had seen a differential equation in 25 years. (I have a son just starting to struggle with them at Rensselaer this year.) — There, Steve, is my story. I hope it is accepted for I need some money. — P. S. I am now with The Carrier Engineering Company, helping them to make every day a good (weather) day. I wish I, or we, could actually do that little trick for lots of other things besides inside weather during these hard times. But we will all snap out of it soon."

Bill also forwarded an extract from the November issue of *Mechanical Engineering* in the form of a paper presented by Earle Ovington at the Seattle Aeronautic Meeting of the A.S.M.E. held in Seattle, Wash., on May 22 and 23, 1930. The title of the paper is "Flying from the Private-Owner's Standpoint," and it gives his answer to the question as to why there are so few private owners of airplanes. He states "the main reasons why the private owner is not a factor in aviation today are that private flying is too dangerous, caring for the ship takes too much time, and the expense is too



1904 Continued

great for the average pocketbook." In his article he enlarges on these statements and it is very worthwhile reading. I regret that lack of space prevents me from including it in full. There was attached a small photograph of "Volts," not a very good likeness as I remember him, and the following short sketch regarding him: "Owner, Ovington Airport, Santa Barbara, Calif.; Mr. Ovington received the degree of E.E. from Massachusetts Institute of Technology in 1904 and is also a graduate of the Bleriot School of Aeronautics, Pau, France. He holds the commission of Lieutenant-Commander in the U. S. Naval Reserve. He is President of The Early Birds, a member of the Quiet Birdmen, the National Air Pilots' Association, and the Progressive Pilots' Association. He was the winner in 1911 of the Boston Globe Tri-State Air Race and \$10,000, as well as the John R. McLean Trophy of \$2,000. He was the first U. S. Air Pilot (1911) and holds a transport pilot's license. Lieutenant-Commander U.S.N.R."

It is evident that Bill Evans must have done some work in rounding up the '04 representation at the Alumni Dinner because he also included the following letter received from the office of *Engineering and Finance*. "Your letter relative to the Technology Alumni Dinner which you have sent to Mr. Guy C. Riddell has been received in his absence in Europe. It might be interesting to Technology men to know that Mr. Riddell is now in Russia as consulting engineer to the U.S.S.R. Communications addressed as follows will reach him there. Guy C. Riddell, Consulting Engineer, N.K.R. K.I., Moscow, U.S.S.R." We have been fortunate in being advised of Riddell's movements from time to time through Professor Locke and it is very interesting to know where he is and what he may be doing at the present time.

As many of you may know, Mert Emerson has made an arrangement with United Engineers and Constructors, Inc., whereby he acts as their New England representative. This concern is a combination of Dwight P. Robinson and Company, Inc., the U.G.I. Contracting Company, Public Service Production Company, Day and Zimmermann Engineering and Construction Company, and is one of the foremost concerns of its kind in the world. We consider that United Engineers and Constructors, Inc., is indeed most fortunate to have entered into this arrangement with Mert. Subsequently Mert wrote many letters to classmates and has received answers from them, a number of which contain items of interest regarding some of our members from whom we have not heard very often. Mert turned the letters over to me and from them I have culled the following items of interest.

Charles F. Barrett writes from the Standard Electric Time Company, Springfield, Mass.: "You will be interested to know that my oldest boy, Frederick, started at the Institute this year and seems to take hold of it in good shape so far. I go down and visit him once in a

while, and renew my acquaintance with some of my classmates that are still there at the Institute."

Harry Rollins sends the following: "I, myself, have made a change since I last saw you, as a consequence of which I have become very inactive in the affairs of the Rollins Hosiery Mills and after the first of the year, though I will retain some interest in the firm, I will sever all connection with the management. However, I will be pleased to pass your letter on to those in charge and I am sure that if anything arises in connection with which they feel your firm can be of assistance, they will gladly communicate with you. The next time I am in Boston I hope to see you. I see you are not very far from Phil Sweetser, whom in the last few years I have had the pleasure of knowing much better than I did in the days at Technology."

Bill Evans writes: "You will see from the letterhead that I am in Chicago. I only landed here this week. This Leather Equipment Company is associated with the Carrier Engineering Company, and I have been sent out here to represent Carrier interests. How long I will be here I do not know." In passing we might remark that the Carrier Engineering Company, with which Bill is still connected, is a concern which has to do with air conditioning in buildings. I do not see the connection between air conditioning and leather equipment, but perhaps Bill will explain to us sometime later.

The following was sent in by Arthur O. Roberts, better known as "Zeus": "I left Amoskeag (I might add voluntarily) nearly one year ago. After a vacation and some fun for a while, I connected last fall with the Lorraine Manufacturing Company at Pawtucket, R. I. My home and family are still in Manchester, N. H., until next summer when I shall probably locate in Providence. Will be very glad to see you if you are in this vicinity (Providence). Look me up at the Biltmore, where I lead a bachelor's existence."

Bill Eager makes the following contribution: "Your friend Newell was here a couple of weeks ago and Currier Lang and I had lunch with him as his guests. Of course, you know Cap and I are always looking for easy Easterners to stick for the lunches. In this instance it happened to be Newell. He told me about your association with United Engineers & Constructors and we all three agreed that it ought to be a very interesting berth for you, and likewise mutually advantageous. We in Detroit hope that somebody will start to build something before long which will have the effect of necessitating a visit from you. In the meantime anything that you might start anywhere would be an improvement over the present situation and we in the tool business would certainly welcome a return to normalcy on the part of the building trades."

On the letter head of the Butte Land and Investment Company, Butte, Mont., Arthur Kemper writes: "My connection with Technology and Technology men

has been so completely broken that I rarely hear of them. Tech seems 'long ago and far away.' We have an occasional gathering of the Alumni in this state. Many of them are young men who don't know a thing in the world about Rogers or Engineering A, B or C, but are products of that newer yet more otiose institution across the Charles." For the benefit of the classmates whose vocabulary is no better than mine, I took the pains to look up the meaning of the word otiose and find it is a synonym for idle, useless, and functionless. It is evident that Kemper still retains the viewpoint of our under-graduate days and is referring to Harvard.

Shorty Holbrook writes as follows: "I note that your head office is in Philadelphia and it occurs to me that you may occasionally visit Pittsburgh. If this is the case I hope you will inform me in advance of your next trip. I shall be glad to put you up at the University Club here and would be able to visit with you during your stay. I consider my trip to Osterville and to the reunion last year as red-letter days and would like to meet with you every year in the same way." I would remind Shorty that we have a Class Reunion every year so that he has repeated opportunities to carry out his expressed desire. His mention of last year's Reunion at Osterville reminds me that Mert was selected as the chauffeur to drive to Woods Hole, pick up Al Read on the dock, and bring him to Osterville. Mert was accompanied from Boston by Don Galusha. Due to some miscarriage of plans Read arrived before the time scheduled and not finding the expected means of transportation hired a taxi and went on to Osterville. Mert and Don sat on the dock for a couple of hours before they decided that something was wrong and called me up at East Bay Lodge. I have no doubt that the arrangement between Mert and the United Engineers and Constructors was consummated by him and Don at that time as Don is one of the very prominent officials of the Dwight P. Robinson Company. Mert told me that while in New York recently he met Oscar Thurlow and had quite a talk with him. As has been stated in these columns before, Thurlow is one of the big men in the electric lighting industry in the South. He is a member of the New York Power Commission and has been engaged in working on a very comprehensive report on the proposal to develop the hydraulic power of the St. Lawrence River.

I shall close these notes with a letter from the Assistant Secretary, General Holcombe. Inasmuch as Mert and his new connection has been pretty well taken care of in these notes, the General's suggestion of an interview with him has not been used. "Currier Lang writes that he disposed of his interest in the Canadian Lamp and Stamping Company to good advantage last spring and since then has been looking for another connection that will give him an opportunity to display his talents in the engineering and manufacturing field. He is in a position to take a small interest in an established business



1904 Continued

or to join in promoting a new enterprise. Possibly some of our classmates may know of just the opening for him, and it might be well to put a news item to this end in the next issue of The Review in the Class Note Section. He says he is free to go anywhere east of Chicago, including Canada, although, of course Detroit has been his home for most of the time since graduation. I see Mert Emerson is now the New England representative of one of the leading engineering and construction firms of the world, and assume that he and Don Galusha are very largely responsible for its future success. There certainly ought to be a headline in the Class News about this, and if you can get Humph Haley or some equally loquacious interviewer to write up a so-called 'intimate' story, it ought to make good reading. If Humph won't do it, do it yourself in his name, it will be just as effective, particularly if you get Gene Russell to be the one interviewed. We are having nice golf weather, and if you and the real Secretary feel like taking a trip down this way, I think we can show you both a good time. Our youngsters are now big enough so we don't have to stand guard over them every evening. In fact, Priscilla is at Cornell so we can't stand guard over her. Marshall is at St. Alban's School and proudly drives himself back and forth every day. He hopes to get into Technology in the fall of 1932." — HENRY W. STEVENS, *Secretary*, 12 Garrison Street, Chestnut Hill, Mass. AMASA M. HOLCOMBE, *Assistant Secretary*, 3305-18th Street, N. W., Washington, D. C.

## 1905

Ralph Whitcomb has been twice reported abroad in these notes and we have been laying for him on his return. A little while ago we heard from his secretary, Miss Blohm, that he was "in again, out again, Finnigan," that he had arrived home on November 17 and, upon short notice, sailed away again on the 26th. Remembering our long wait and our inability in the past to loosen up Ralph, we appealed to Miss Blohm who very kindly replied on December 3: "Mr. Whitcomb arrived in Moscow on January 23 (1930). After making several trips through both northern and southern Russia he left for Budapest in May returning to Moscow the middle of June where he remained until October 23, when he left for Paris and London on his way back to the States. He is now in London. I am sure Mr. Whitcomb's report will be most interesting and it is to be regretted that because of the urgency of business he could not give you his views on Russia and its problems before he sailed. However, he is adding to his store of experiences so that when you do hear from him his report will indeed be a generous one."

Frank Chesterman has also been abroad and he has promised to tell us about his trip. If he doesn't get busy pretty soon, we shall appeal to Miss Groff.

"The trouble is that the story is quite uneventful. Ever since I left the Institute, I have been with Phoenix Bridge Com-

pany. Two of my children are in their teens and the third soon will be. Earning a living and raising a family, however satisfactory to an individual, offer little for copy." That is Bob Foulds, assistant to the general manager. The sentiment expressed is not novel, but one may still believe there's a story if Bob can be gotten started. — A dispatch from the south brings the story of Andy Fisher's activities in the installation of the first Southern Kennel of the Ancient and Honorable Royal Order of Yellow Dogs. This took place in Charlotte, N. C., and Andy was the chief dog catcher. At other times he seems to be associated with the Abbott Machine Company, of Wilton N. H., which has something to do with textiles.

The Register of Former Students was responsible for the discovery of Walter Cain who writes: "Between 1912 and 1921, while building automatic machinery for making hair pins, paper clips, and so on, at the Baird Machine Company, Bridgeport, we used to ship a machine to Whitin Machine Works occasionally and I had about the same thought you expressed; 'wonder where Whitinsville is.' After getting out the atlas, I discovered that Whitinsville is located in the Blackstone valley about half way between Worcester and Providence and looks the same whether you enter it from one direction or the other. The works own all but something like 70 houses in a town of about 3,500. The company not only owns your house but also cuts the lawn, takes away the ashes, furnishes milk and ice, and sells you coal. In fact it does everything but put the baby to bed although our 'one-only' has passed that stage and is now in the high school period where she thinks it's about time the old man bought her a car of her own. The plant builds textile machinery, spinning frames, cards, picking and opening machinery, and so on, and ordinarily employs 26,000 to 28,000 men, at the present time developing quite a line of rayon machinery. I have been here since 1922, first as assistant and the last couple of years as production manager. Andrew Fisher was in here last year and I met him again at the Textile Show in Boston this summer. Except for him, I have hardly seen or heard from an '05 man since leaving the Institute."

A new address, Monaca, Pa., made it seem that Walter Clarke had moved. But no, "I have the same job here in Monaca. Pittsburgh Screw and Bolt Corporation, Colona Works (instead of Colona Mfg. Company), is a change of name only — the result of a merger, live in the same town, Beaver, and have the same family, one wife and one son. I haven't done any traveling, written any books, engaged in any scientific or engineering work or accumulated any real money. Moreover, although I have tried repeatedly, I have been unable to learn to play bridge or golf. So you see I'm a total loss! It is not surprising that you never heard of Monaca. Neither had I before I came here. It is on the Ohio River about 28 miles from Pittsburgh and at the big bend

where the Ohio was turned south by the glaciers of the ice age." This puts Monaca's fame pretty far back.

The buildings of the Powder Point School in Duxbury, have been acquired by the National Sailors' Home. That prevents our holding future reunions there but, on the other hand, provides a refuge for Boggs and Davis after they have retired from the sea. — After the Gillette Auto-Strop merger, Hub Kenway is still working on safety razor patent business. — Bob Lord has moved from Danvers, where he has resided since he came up from Maine about ten years ago, to North Woburn to be near the Lord Brothers Tannery of which he is president. According to report, the tannery is busy and doing very well. Bob was in New York one day this fall when your Secretary was there. Although we heard of that through Bill Motter, we were unable to connect with Bob before his train left.

The Twenty-Fifth Reunion film is finished and ready for distribution. Though its authors are not particularly proud of their work (i.e., one of them isn't). They believe however, that there is much in the film to interest both those who have attended reunions and those who have been unable to get back. Just arrange for an '05 party in your section and tell the Secretary. There is no base rental or other charge. — ROSWELL DAVIS, *Secretary*, Wesleyan Station, Middletown, Conn. SIDNEY T. STRICKLAND, *Assistant Secretary*, 20 Newbury Street, Boston, Mass.

## 1906

Some time ago a letter was received from Herbert Whiting advising that he had made a call on Joe Santry. In the course of the conversation next year's Reunion was mentioned, and Joe said he would be very glad to make arrangements for us to have facilities at the Corinthian Yacht Club at Marblehead, Mass. Herbert also mentioned that he had been laid up for a couple of months.

Speaking of the Reunion, the Class will be interested to know that the Secretary has also been in correspondence with several possible places. It is expected a more definite announcement as to time and place will be given in the middle of January. Meanwhile keep in mind we will be celebrating our Silver Anniversary this coming June, and all plans, schedules, and budgets should be made accordingly.

The following letter was received from Otto Blackwell on December 19: "A week ago Monday at a banquet of the New York Technology Club we had an opportunity to hear President Compton speak. I am hardly in a position to claim that the Class of '06 was well represented as the total attendance from that class consisted of myself. However, I sat with three men and one lady, all of whom claimed allegiance to '07 and a fourth man who was, I believe, '08 but came late and did not find room at his regular table. We enjoyed a very interesting talk which President Compton gave regarding Technology. — We hope sometime in

1906 Continued

January to attend a seminar at which Professor Jackson and Professor Bowles will tell us about the progress of work in Course VI and give us all a chance to discuss it with them."

There is ample evidence that the ladies read the '06 notes. We acknowledge our indebtedness to Mrs. Floid Fuller for the following information. Contributions from the ladies are always welcome. "Yesterday on reading the '06 notes in *The Technology Review*, it occurred to me that you might like to know that my husband is proudly wearing a pair of silver wings on his coat which I'm sure were more honestly earned than anything he has ever done in his life, even counting his two Tech diplomas. Though the greenest kind of a beginner, he has had about 130 flights and his Pennsylvania student flying license is 526. The type of plane used at the Bethlehem airport is a D. H. Moth and the very capable instructor is a young chap, Rupert Herr, with over 3,000 hours of flying to his credit. Floid is Distribution Engineer with the Pennsylvania Power & Light Company, headquarters in Allentown. He is also Vice-President of the New England Society of the Lehigh Valley. — He does not know I am doing this so I hope all is correct. Want to surprise him. Robert, our six-year-old, reports flying 'feels like a sidewalk' (level, straight and smooth). Isn't that neat? Marian, 10, has yet to be initiated. — We started out together on air ground school work at the airport last May, but I failed to pass the eye test and was thrown out of the class. Last year on leaving Boston we tried to fly to New York on Sunday but found no planes in operation then to New York. Next visit we hope to be independent of regular schedules and will run ourselves."

Incidentally, Floid is also a Lieutenant Commander in the Naval Reserve. In the course of his annual sea duty he was on a destroyer which moored at the Boston Navy Yard for several days. The Secretary and Mrs. Kidder spent a very pleasant evening on the Fuller ship at that time. From Mrs. Fuller's letter we realize the importance of scheduling our Reunion convenient to an airport.

The following was received from the pen of Henry Ginsberg: "While out sight-seeing in Berlin this past summer, I met a man who came from Honolulu. I asked him if he knew Bill Furer and he said he knew him very well. I asked him to give him my regards, and today I have received a note from Furer stating that he had done it. The world is a small place, after all. Furer writes that he edits a weekly bulletin of the Engineering Association of Hawaii."

"In Europe this summer I visited many countries, among them Scotland, England, Belgium, Holland, Germany, Czechoslovakia, Austria, Switzerland, and France. Had a very nice trip, and took some 'movies' of the places visited."

Again we are indebted to Professor Locke for items concerning the 1906 miners. Clifford R. Wilfley, mining engineer, and Oscar N. Bribach, analyst,

are conducting a partnership at 1948 Broadway, Denver, known as Wilfley and Bribach. — F. W. Libbey, who has been in charge of the Pinto Valley Company's properties at Miami, Ariz., is now in charge of properties of the Zenda Gold Mining Company at Barstow, Calif. The same interests are back of the two properties. — JAMES W. KIDDER, *Secretary*, Room 505, 261 Franklin Street, Boston, Mass. EDWARD B. ROWE, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills, Mass.

## 1907

We are very happy to say that Lawrence Allen, who was seriously sick during the fall of 1930, is gradually getting stronger and able to attend to his business duties. Lawrie's home address is 6 Stonehedge Road, Andover, Mass., and his business office is at 140 Federal Street, Boston, the United Shoe Machinery Company. — Kenneth Moller is President of Textile Patent and Process Company, having started his own company April 1, 1929, developing patents in the textile industry. His office is at 263 Summer Street, Boston. In the Boston *Herald* of December 21, 1930, we noticed announcement of the engagement of two of his daughters.

Earl H. Reed, Jr., 2600 Tribune Tower, Chicago, represents Reed's private architectural office address, and he is also head of the department of architecture at Armour Institute of Technology. He contributed a paper on "Midwest Modernism" as part of a symposium on modern architecture at the Sixty-Third Annual Convention of the American Institute of Architects at Washington. Last summer, due to quiet building activities, he did six weeks of water coloring at Estes Park, Colo. He served as architectural adviser to the Chicago War Memorial Committee which held a nation wide competition last spring. — James Reed is general manager of Schlage Lock Company in San Francisco, and is a member of the City Planning Commission there. — BRYANT NICHOLS, *Secretary*, 2 Rowe Street, Auburndale, Mass. HAROLD S. WILSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

## 1908

Don't forget the second get-together dinner of the 1930-31 season which will be held in the Faculty Dining Room, Walker Memorial, Tuesday evening, February 10, at 6:30. This will be our annual meeting so it is hoped that we will have a good attendance.

George Freethy, formerly New England District sales manager of the Worthington Pump and Machinery Corporation, announces the formation of The Pump Equipment and Engineering Company with offices at 427 Cambridge Street, Allston, Mass. This new organization will engage as an authorized Worthington dealer, in the engineering, sale and service of pumps, air compressors and industrial meters. They will also be agents for Swendeman Water and Oil

Separators and for other miscellaneous power plant equipment. — Harold P. Gurney is now living at 2 Strathmore Road, Brookline, Mass. — HAROLD L. CARTER, *Secretary*, 185 Franklin Street, Boston, Mass.

## 1909

Molly Scharff, who is associated with Main and Company, accountants and auditors, writes that he attended the Annual Dinner of the Technology Club of New York on December 8, and had the pleasure of seeing a number of our Class. We were represented at the head table by Senator-Elect Thomas C. Desmond, who is President of the Alumni Association.

Arthur Hartwell is President of the Hartwell Iron Works at Houston, Texas, and according to his letterhead operates a pattern shop, machine shop, and structural and plate steel works. — Information has just come to the Secretary of the death on November 16, 1930 of Peter F. O'Shea, of Northampton, Mass. — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. PAUL M. WISWALL, *Assistant Secretary*, General Foods Corporation, 250 Park Avenue, New York, N. Y. MAURICE R. SCHARFF, *Assistant Secretary*, 19th Floor, First National Bank Building, Pittsburgh, Pa.

## 1910

John Ahlers was on the list of the members of the Class who received requests for letters this month, and writes as follows: "Since the very enjoyable reunion business has been so quiet that there has been little activity and, having had no contacts with other members of the Class (I have been laid up for a month with a light touch of pneumonia) cannot even report the Alumni Dinner of last night, which I hear was a great success. Still I have hopes to take up Bell in the golf contest which we did not finish, even though playing barefoot in the rain, and it would be fine if the whole Class could have a reunion down in his territory where it must be fine and warm by this time."

I am sorry that Ken Armstrong feels that I have cut his items too much in the past. I present herewith his letter in full and portions of two items in the *Rhode Island Avenue Press* of Washington, D. C. "I have your letter of November 29 requesting a letter for inclusion in the '10 Class notes in *The Review*. On several previous occasions I have sent you newspaper clippings and other items in which my name has been mentioned in connection with civic affairs in the national capital, which has been my home for nearly 15 years, but you have usually edited them so thoroughly that there was not much left to print. If I must confine myself to my business and financial affairs, there will not be very much to print."

"Perhaps I have spent an undue amount of time during the past 15 years in public affairs, especially for one who lives in a voteless city where all the remunerative public jobs are filled with political appointees. It has brought me no direct



1910 Continued

financial return, but during most of that time I have been so situated that I had the time to do it, and, since I have enjoyed it, and have felt that I was doing a greater service to mankind than I would had I confined myself to the mere acquisition of money, I have not yet regretted it. I am enclosing herewith a copy of our local weekly newspaper, with several items marked. I am also enclosing a copy from page 83 of 'Who's Who in the East.' To this latter should be added, to bring it up to date, President, Washington Society of M. I. T., 1930; President, Burroughs Citizens' Association, 1930-31; Delegate to the Federation of Citizens' Associations, 1930-31.

"Now as to my job. I came to Washington in 1916 in the employ of the Bureau of Valuation of the Interstate Commerce Commission. In 1922 I resigned to go into the real estate business, where I have been ever since. That is all there is to that."

"Who's Who in the East:" contains the following: "Civil Engineer, Realtor, Builder. Born at Somerville, Mass., December 19, 1887. Son of Howard Blodgett and Evangeline (Potter) Armstrong. Married Lillian Elliot, Winchester, Mass., September 15, 1915. Children: William Elliot (II); Howard Potter (6). Ed: Public Schools, Somerville; Somerville Latin High School; Massachusetts Institute of Technology (B.Sc. in C. E., 1910). Member Washington Society of Engineers; Washington Board of Trade; American Association of Engineers (1st Vice-President, Washington Chapter, 1920); East Gate Lodge No. 34, Masons (Past Master); Woodridge Chapter No. 15, R. A. M.; East Gate Chapter No. 21, O. E. S.; Rhode Island Avenue Citizens' Association. Politics: Republican. Civil Engineer various positions, Mass., 1910-14; Bureau of Valuation, Interstate Commerce Commission, 1914-22; member Citizens' Advisory Council, 1927-28; Delegate to Federation of Citizens' Associations, 1928; Director Northeast Building Association, 1921-28. Office: 2002 Rhode Island Avenue, N. E. Home: 1512 Kearney Street, N. E., Washington, D. C."

From the *Rhode Island Avenue Press*: "As President of the Burroughs Civic Association, K. P. Armstrong is going to set a new pace for those who are trying to qualify as community builders. Mr. Armstrong is not a newly developed community builder; he is an old-timer in this line of activity. For more than ten years to the writer's personal knowledge he has been giving this northeast section a more attractive place in which to live. Many an effort he has made in our behalf. Not every effort has resulted in success, but he has a high score. Many is the time that he has hit the bull's eye squarely in the center."

From the same paper is the following item: "Dr. Karl Taylor Compton, President of the Massachusetts Institute of Technology, was guest of honor and principal speaker at a dinner given at the University Club by the Washington Society of the M. I. T. organization of

local Alumni. Dr. Compton was introduced by Dr. F. H. Newell, former chief of the Reclamation Service. Proctor L. Dougherty, former District Commissioner, was chairman of the committee on arrangements. Kenneth P. Armstrong, President of the Society, was toastmaster." — DUDLEY CLAPP, *Secretary*, 40 Water Street, East Cambridge, Mass.

## 1911

O. W. Stewart, I, chairman, not only has the general committee on its toes, but at a recent meeting in Boston regional chairmen were selected as follows: Hal Robinson, I, Worcester; Dennie for Maine; Harold Smith, II, Manchester, N. H.; Morrell Mackenzie, II, and Chet Morey, II, Providence, R. I.; Ted Van Tassel, X, Norwich, Johnnie Scoville, IV, Hartford, Frank Smith, III, Waterbury, Edwin Pugsley, VI, New Haven, Conn.; Bill Orchard, XI, Don Stevens, II, Dick Ranger, VIII, and Erv Young, I, in New York City and vicinity; Joe Harrington, VI, Albany, Howard Ireland, XI, Auburn, Norman Duffett, X, Niagara Falls, New York; Carl Schafer, XIII, Philadelphia, Bonnie Wilson, XIV, Pittsburgh, Pa.; Ban Hill, I, Baltimore, Md.; Pete Gaillard, VI, and Alec Yereance, I, Washington, D. C.; Don Frazier, II, Richmond, Va.; B. Darrow, VI, Akron, Ohio; Jim Duffy, VI, and Johnny Wilds, II, Chicago, Ill.; Minot Dennett, II, Detroit, Mich.; George Forristall, II, Houston, Texas; Charlie Barker, VI, Los Angeles, Calif.; and Bill Pead, VI, up in Montreal. Every effort is being made to have a banner attendance at this, our Twentieth Reunion and now is the time to mark the dates June 26 to 29 on your calendar and plan to attend.

By the time these notes appear we will have had another '11 dinner at Walker Memorial, for January 16 is the date now set. Quite a number of us were at the Hotel New Yorker in New York City on December 8 at the highly successful dinner tendered President Compton by the Technology Club of New York, Richard Howland Ranger, President and toastmaster. Yours truly went over to New York to lead the songs and cheers and you should have heard Dick and Dennie playing Tech songs on twin baby grands! Dick's wife was at the ladies' guest table, and those at the '11 table included Mr. and Mrs. Jim Campbell, I, Mr. and Mrs. Dick Gould, XI, Roy MacPherson, II, Bob Morse, VI, Don Stevens, II, Emmons Whitcomb, X, and Erv Young, I.

Dippy Allen, II, has left Meriden and now is at 124 Hesketh Street, Chevy Chase, D. C., we are advised by the Alumni Office, and probably he's working in the city of the Capitol but we don't know for sure. — Warren Hopkins, VI, is at present over in New York attached to the New York office of Stone and Webster, for which organization he is head of engineering. — Rudolph Emmel, III, writes from Trujillo, Peru, where he is associated with Northern Peru Mining and Smelting Company, that he regrets he probably can't attend the Reunion, but, he continues: "If everything goes

well I may make it the next year, and if things go well it may be before next June. We're all working 'likeell' trying to keep the losses down to a reasonable figure so that the plant can keep on running."

Phil Kerr, II, who is at Hilltop Crossing, Charleston, W. Va., says the Reunion looks very inviting although he's afraid he can't attend. "Work has been going on apace — at times hectic," he writes, "and there has not been a great deal except work and incidental recreation. The nature of the development work has required me to travel some, and I was able to get to Boston during the summer for a day or two. We are now selling quite a little methanol antifreeze to keep the radiators of America from freezing up." — Sam Lawton, II, hopes to be at the Reunion, but says he's "still in the wool business, and nobody in the textile industry knows anything, so no news for class notes." — Frank Osborn, III, with the Andes Copper Mining Company, Potrerillos, Chile, says: "No chance I see now that I can attend, but let's hope it's our best reunion ever!"

Munroe Pevear, IV, writes that he is having very good success with his Pevear Color Specialty Company, 71 Brimmer Street, Boston. His laboratory is equipped to test, furnish materials, and service for all color and illuminating problems. Among recent customers he has had our Walter Hampden, The Theater Guild of New York, Metropolitan Opera Company, Westchester County Park Commission, and many schools and colleges. He adds: "Not much like Course IV, but that study was half my foundation. No children, but I have a lady! Hope to be with you June 26." — Jim Pierce, V, is still hanging on, as they say, with Barium Reduction Corporation, Charleston, S. C. — Heine Zimmerman, assistant to the Vice-President, American Sheet and Tin Plate Company, Pittsburgh, hopes to be with us in June and says he almost got to Douglas Inn last season, when he was in New Hampshire. He says Buny Wilson, another Pittsburgh Pirate ('11), recently reported having seen Don Stevens on a trip to New York and learning from the latter that "the fellows are all strong for Douglas Hill and will not expect to carry off all the table silver as souvenirs." In concluding his letter he said "Classmates in these parts are rather scarce but once in a while, in the big city, I cross the trail of Whitcomb and Haslam, the latter being one of the pillars of the Standard Oil Company. In Pittsburgh, however, there is plenty of Technology interest and our Club is doing business of several stands."

Well, mates, in closing let me remind you that the Annual Banquet of the Alumni Association will be at the Statler in Boston on the evening of February 28. Let's have a big '11 table there and talk over features for the big reunion at Douglas Hill, Maine, June 26-29. — ORVILLE B. DENISON, *Secretary*, Douglas Inn, Douglas Hill, Maine. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.



## 1912

The Annual Alumni Banquet in New York on December 8 brought a few members of the Class together again. Let's look 'em over! Eric Kebbon, VI, our Class President, turned out and also persuaded Jerome C. Hunsaker, XIII-A to come. Kebbon, as we have reported before has his own architectural office in New York. Hunsaker, who is a Vice-President of the Goodyear Zeppelin Corporation, has become almost a commuter between his company's offices in Akron, Ohio, and New York City. His principal interest and activity now is in bringing to successful completion another big dirigible that is under construction for the U. S. Navy. On our left we found Page Golsan, VI, and Mrs. Golsan. They probably hold a record in that their son is a freshman at the Institute this year. Across the table sat John P. Minton, VIII, and Mrs. Minton. We understand that Minton has his own laboratory in White Plains where he carries on research and consulting work as a radio and acoustical engineer. His address is 11 Robinhood Road, White Plains, N. Y. Minton promised to write us a letter telling all about this and other things, but it had not been received up to the time of writing this report. Your Assistant Secretary concluded the roster of those present representing 1912.

Page Golsan gets another mention here. The New York Times, December 13, quotes at some length Golsan's views on the anti-trust laws as contributing factors to the present business depression. He takes the position that overproduction is caused by the inefficient, obsolete manufacturing plants which can be operated profitably only in periods of great prosperity, and against which the other manufacturers are restrained from protecting themselves by anti-trust laws that are now out of date. — From Jonathan A. Noyes, II, we received the following letter: "You know that the belated and unexpected orders, especially in times of depression, are the ones most appreciated. Consider this letter my formal order for one of the vest pocket kodak snapshots showing the '12 Class Reunion gang, which was referred to in your Class Reunion Notes of July 15. In order to work the old reciprocity game I am enclosing herewith a pocket kodak snapshot which incidentally is a couple of years old but from which you will, nevertheless, notice that one of the '12 representatives at the Head of the Lakes has a reunion every time he is at home at the Zenith City. My work still keeps me traveling considerably, west to Montana, east to the Soo, south to Iowa and north to the Arctic Circle." The snapshot which he mentions shows six robust looking youngsters who appear to have joyous dispositions, or else the photographer had promised them a load of lollypops. At any rate, they are all smiles, except the baby who seems rather bored with the whole business. John neglected to mention that he had been elected Secretary of the Duluth-Superior Technology Club.

Your Assistant Secretary reports a pleasant visit from Max C. Mason, VI. Max was in New York for a few weeks, in connection with a traffic study which Stone & Webster is making for one of their clients. He has been with Stone & Webster ever since he was graduated, and has had some interesting experiences. Some of these were related in his letter published in these columns a year or two ago. Since then he has been doing some traveling for the company. Last summer, he and Gardner Rogers '02, were sent to Japan to make an examination of the properties of one of the large power companies there and a survey of the general power situation. They had an opportunity to see quite a little of that interesting country as they had to visit hydro-electric plants far up in the mountains. Mason tells us that Japan has a very fine and well-developed interconnected power system and certifies the rapid industrial progress of the Japanese people.

Your Secretary, who by the way is Alumni Council Representative for the Technology Association of the Philippines, had the pleasure of sitting next to Roy Chandler, VI, who represented the Technology Club of Western Pennsylvania at the last meeting. Roy is still located in Worcester with the Gratton-Knight Company and summers at Scituate, Mass. — A very interesting letter from D. E. Bent, VI, describes his trip of last summer. Having disposed of his central station properties in New Mexico, he purchased a tourist bus and during July and August toured through the national parks with his wife and two daughters. I understand the bus is now located in Tucumcari, and is open for charter for a trip through Arizona and southern California, and I shall be pleased to send a photograph to any interested parties. The Bent family expect to take possession early next summer and plan to tour east to the sea coast. — Fred E. Barker, X, is Secretary-Treasurer of the Technology Club of Central New York. — FREDERICK J. SHEPARD, JR., Secretary, 125 Walnut Street, Watertown, Mass. DAVID J. McGRATH, Assistant Secretary, McGraw-Hill Publishing Co., Inc., 10th Avenue and 36th Street, New York, N. Y.

## 1914

The second of our series of winter luncheons held in Boston was most successful. Chet Corney gave a very interesting picture of the new 220,000-volt transmission system supplying power from northern Vermont to metropolitan Boston. Those attending the luncheon were: Corney, Ahern, Crocker, Mackenzie, Crowell, Atwood, Morrison, Fales, Wilkins, and Richmond.

One of the joys of being in the educational field is that vacations are frequent and long. Frank Somerby, who for several years has been teaching in New York City, has always made the best of these vacations. This year he is utilizing the two weeks Christmas period to drive down to Miami and then across the

Tamiami Trail to St. Petersburg. No wonder Somerby, Fales, and others like the teaching field!

On December 9, the Boston Herald carried the following notation regarding Porter Adams: "A low bow to Porter Adams. Porter Adams, whom nobody knows by any other name than Pat, is a sick man. He has been ordered to Arizona by his doctors, but he's not there. He's in Washington — working in the interest of aviation, to which he has devoted most of his life. Two days in every three he's had to stay in bed. He's been just well enough to get up on the third and go to the offices of the National Aeronautic Association, whose board of governors he heads." More power to you, Pat!

The Patent Office must have a special section to take care of '14 men. Very frequently the Patent Office Gazette carries a note of a new patent issued to one of our classmates. A recent issue recorded Patent No. 1,784,858 covering a sound recording system, as having been issued to Edward C. Wenthe. Wenthe, it will be recalled, has become one of the country's experts on sound problems.

For the last few years, Buck Dorrance has occupied that very responsible position of General Manager of the Campbell Soup Company. In his spare time, he is a director of the Federal Reserve Bank of Philadelphia, of one of the Pennsylvania Railroad subsidiaries, and takes an active part in affairs around Philadelphia and Camden. Following the sudden death of his brother, Dr. John T. Dorrance '95, on September 21, the Board of Directors of the Campbell Soup Company elected Buck President. This places him as President of one of the country's large enterprises, and as the most successful member of our class. Congratulations, Buck, and every good wish for a most successful business career, which you so well deserve! — HAROLD B. RICHMOND, Secretary, 30 Swan Road, Winchester, Mass. GEORGE K. PERLEY, Assistant Secretary, 21 Vista Way, Port Washington, N. Y.

## 1915

The well known business depression seems to have leaked again into our Class Notes for it is getting increasingly difficult to secure news from our classmates or about them. However, we wish to maintain the proud record of not having missed any issue of The Review, so I hope you fellows will write in something for our column. The best news this month is the announcement of the birth of a new daughter to Mr. and Mrs. Frank P. Scully, I. I am sure all the boys will join me in sending Frank and Mrs. Scully our hearty congratulations and best wishes. I hope next month we can have a bigger column with lots of interesting letters. — AZEL W. MACK, Secretary, 379 Marlboro Street, Boston, Mass.

## 1916

Steve Brophy as general chairman of the reunion committee has been making remarkable progress in laying plans for next June. Steve has practically completed arrangements for location, which will be

1916 Continued

somewhere in Connecticut on Long Island Sound. Everything points to a much larger attendance than at our Tenth Reunion. If you have not already made your plans to be there, we wish to urge again that you start now to have three or four days available early in June.

Lewis Vose is located in Readville, Mass., with the Stafford Company, who manufacture weaving machinery. He writes: "The Company that I am with has had the benefit (?) of my services since leaving Technology in 1915. A lot of water has run under the bridge in that time and I have nothing to complain of. After living down the stigma of being a Tech man in an atmosphere predominately favoring Dartmouth and Harvard, I landed at the top of the development end which means messing around with a lot of new ideas that we hope will appeal to the textile trade when it recovers from its present and long-continued depression. When anyone asks me for specific details regarding my work, I am expected to change the subject, so we will let it go at that. It is sufficient to say that they have found reasons to keep my work going under all business conditions."

"As to attending the Reunion in the spring, I cannot say whether it will be possible or not. I should like to, although probably would be a total stranger to those present. I spend considerable time away from these parts and never know at what time I may be going nor for how long. This makes it difficult to plan ahead for even a short period. Leave it that I will attend if possible."

Ed Barry is always to be counted upon at reunions. Ed says: "I will of course attend the Reunion if I can possibly do so. I hope we can have a large attendance, for I have seen very few members of the Class since 1916 and will enjoy renewing old acquaintances. I can give you little news about myself. I am still supervisor of power for West Virginia Pulp and Paper Company, located in the engineering department in the general offices of the company, New York Central Building, 230 Park Avenue, New York. Since we operate five pulp and paper mills, all generating their own power and steam, there are enough problems of design, operation, distribution, maintenance, and accounting to keep me busy. I have recently contributed articles to the magazine *Power*, also *Heating, Piping, and Ventilation*, all on the general subject of 'High Pressure Steam and the Industrial Power Plant.' My family consists of my wife and two boys, the latter aged four and nine. We live at 59 Palisade Avenue, Dobbs Ferry, New York."

It was most pleasing to receive the following newsy letter from Kem Dean. "Your very welcome letter of the 28th ult., received and naturally delighted to hear from you after so long a time. It is hard to realize that 15 years have slipped by since the happy days at Tech, but I imagine the next 15 will get by even faster than the last. I have been planning to go to Boston this coming summer with my wife and two little girls aged six and two, and hope nothing prevents. I went

home summer before last and feel another visit coming on. The Reunion is another inducement and I would certainly hate to miss it!

"The old firm, Sanders and Company went out of business which accounts for the above letterhead, Dean and Bourret. The cotton business has had its ups and downs the past two or three years, mostly down, and now with so much government interference on the part of the Farm Board, it is in the most hopeless condition ever. The entire trade would breathe a sigh of relief, from farmer to spinner, if the government would lay off and let us work out our own difficulties. A hands off policy is the only thing that will restore confidence, demand, and prices, and while the cotton people all realize this, I do not think the public in general including the politicians do — but they will as soon as all the money has gone."

It was our pleasure to again receive a most intriguing Christmas card with Chinese characters from Irving McDaniel. In addition he also sent me a picture postcard from the Dutch Indies showing many of our good old friends such as Bacardi, Crème de Menthe, Windsor Sloe Gin, and so on, all in bottle form. The caption on the card was "Some of the Reasons Why I Like the Orient." In addition Mac writes: "Having a great cruise in the East Indies — Singapore, Java, Bali, Macassar, Celebes, Sandakan, North Borneo, and so on. Looked up John Ingles in Singapore but he had just left for Sumatra. He is doing very well with Goodyear and everyone likes him in Singapore. Sorry I missed him. Bali is the place — the last Paradise — you ought to get out this way. I expect to get home in May."

Johnny Fairfield is now a full professor and gives us the following information about himself from Troy, N. Y. "My family is helping support the medical profession with measles and whooping cough and the like regularly and systematically. There is no news here; all quiet on this front. The only member of the Class I have seen in two years is John Eberhardt of Arlington, Mass. As to next June, that is very doubtful; these reunions usually come while I am still busy with exams and financing them is difficult."

Jack Hepinstall still cheers for sunny Southern California. Jack reports: "News about my family will take up no space whatever, because I haven't one. I still belong to the Knights of Independence. As for news about myself, I imagine that it is about as important as news about my family. Brute Crowell and I have been together for the past ten years associated with his father in the general contracting business here in Los Angeles. We build a few buildings now and then. So far all of the buildings that we have built have withstood the shocks from the terrible California earthquakes that you read so much about in the eastern papers."

After a long continued silence, it seemed mighty good to receive word from Rusty White. He gives a perfect alibi from Chicago but I suspicion that

he is engaged in some sort of a racket with Al Capone. Rusty says: "Put me down with a question mark for our 1931 Reunion. Maybe I'll get there. My business news is that I am now with Remington Rand Business Service, Inc., 214 West Monroe Street, Chicago, as salesman in their powers division. For the past two years my work has been in developing the invention of Royal and Woodruff, both of Class of '18 which is called Central Records Machines, and which consists of remote control of punched card accounting by means of electrical transmission of punched card data. Look forward very much to being at the Reunion this coming June if business permits."

Dinah Coleman operates the Big Run Coal and Clay Company at Ashland, Ky. He promises to be present in June and writes: "The Reunion sounds good. Unless I break a leg or just naturally break, I shall be there. I recall that we had just completed the incorporation of this company just before the last one, and I celebrated by making the Fisher's Island rout. Since then, we have come a long distance, all the way through woods, and had our consignment of Republican prosperity arrived when we ordered it last spring, we would have been out in the open. As it is, our business has grown to the point where I shall have to shed some of the titles I have, and spread them around a bit. Of course this will give more time to perfect a process which will revolutionize the industry.' You see, like most Tech graduates, I think I have found out what is wrong with the industry I happened to cast my lot with. I expect it is a good thing that so many of us, and not the industries, are wrong, lest the business world be kept in a continual state of revolution."

"Our family now consists of my wife, one boy three years old, a boy 18 months old, and a pair of twin girls five months old. Needless to say, when they all get to crying at once no neutrodyne squeal ever equalled them. We are living in an absolutely fireproof tile and concrete house hid in the woods near the plant, with a telephone that may be disconnected at will, so that the world and its troubles are silent after sundown, as far as we are concerned. We had a log house on the same spot last year, and it caught fire from lightning in the wiring, and burned to the ground in 30 minutes. We saved the children, the family plate, and a pair of white pants which I was keeping to wear to the next reunion. Lightning may tear the new one down, but I know it will not burn, and that is a big mental relief."

"I see Alan Gould now and then, and one or two fraternity brothers of other classes, but nary a '16 man in these parts, and I hope that if any of them see this letter, they will take the time to drop me a line or call, whenever they pass through here. Here's hoping that you develop a non-losable golf ball soon, for the mortality rate on balls was so great with me, I have had to consider my dues at the golf club in the nature of a contribution."



1916 Continued

Don't forget you will have more fun in attending the Fifteenth Reunion in June than anything else you can think of. Start making your plans now. — HENRY B. SHEPARD, *Secretary*, 269 Highland Street, West Newton, Mass. CHARLES W. LOOMIS, *Assistant Secretary*, 7338 Woodward Avenue, Detroit, Mich.

## 1917

Joe Gargan, of the former Erb-Wallis-Gargan triumvirate, came in to report a visit in this vicinity from Harry Toole who is still with duPont in Buffalo doing work on viscose. Toole has completely recovered from the physical difficulties that bothered him a few years ago and is apparently happy and prosperous. Joe occasionally sees Phil Hunt — the big construction specialist of Salem and Peabody. He also saw Phil at the University Club for a minute recently, but as he was there for some big butter and egg discussion there was no chance for getting any news from him.

Under cover, men who have been at work since the American Legion convention in Boston report that the Honorable James G. Doon, prominent citizen of Henniker, N. H., foremost magnate in the bicycle rim industry, leading member of the legal profession, and well known in educational circles (in Henniker), covered the route of the Legion parade twice, marching in two different contingents. Neither the New Hampshire delegation nor that from Natick, Mass., could forego the honor of having this leading citizen in its section of the parade. — RAYMOND S. STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass.

## 1918

With his feet atop an American Tel. and Tel. desk at 195 Broadway, Mal Eales helps us to tell and tell by contributing '18 tid-bits to The Review boiler plate. Sez he: "As you know we arranged a dinner for December 1, thinking that some of the fellows from Boston might be down here for the Power Show. If they were, we didn't see them but we had a good time anyway. Pete Sanger, by reason of being in the advertising business, doped up a letter which resulted in the biggest turnout we have had, 18 in all including, beside himself, Ned Longley, Jule Avery, Ken Reid, Sax Fletcher, Nat Krass, Karl Ford, Tom Brosnahan, Pete Harrall, Ev Rowe, Russ Mumford, Sidney Judson, Clarence Fuller, Jack Kennard, Walt Robertson, Granny Smith, Charlie Taverner, and myself. Pete Sanger seems to fulfill the definition of a typical salesman in being a slick gent who sells something he can't deliver to someone who doesn't want it anyway. The dinner was held at the Rose Marie Tea Room but Pete, feeling the boys would be suspicious of getting little or nothing to eat at a tea room, worded the notices to read 'Bakers Club' at the same address. After the dinner we sat around and fought the war all over and then some of us went to the Power Show, where those of us who are not engineers

in the strict sense were awed at the multiplicity of gadgets that have been developed since we were exposed to heat engineering, electrical lab. and so on.

A couple of weeks ago Pete Sanger, Karl Ford and I journeyed to New Haven to see the alleged classic, the Harvard-Yale game. After enjoying a delightful lunch that Mrs. Sanger had provided we meandered into the Bowl where, from seats we were fortunate to secure 1,500 yards behind the goal posts, we saw a good game. We ran into several of the '18 celebrities including Monk Pierce, Chink Watt, Mr. and Mrs. John Kiley, and Mr. and Mrs. Eaton Clogher. In spite of all he has preached the past 15 years, Eaton stepped off last summer and we understand they are living in New Haven. I talked with J. Emerson Cassidy the other day. He has been in Buenos Aires for over a year in connection with the installation of the radio telephone terminal there for the New York-Buenos Aires Circuit. He is now a proud 'poppa' having a ten weeks' old boy who, I guess, keeps him stepping already."

Continuing the toe-nail sketches of what some of the battalion of '18 men on the Institute staff are doing, we come to Richard H. Smith, associate professor of aeronautical engineering. After getting out of the "factory on the Charles" with the earmarks of Professor Schell's engineering administration still wet, he got into the government service at Washington. Amid technical problems at the Bureau of Standards and the demands of raising two daughters plus one son, Smith still had time and courage to get a Ph.D. from Johns Hopkins — and to do it well enough to be summoned to the Institute staff. As you pass along the multitudinous crank shafts of the engine lab. there are two wires that stretch from one end to another. At the northern extremity of the lab. by Professor Fuller's office are concrete counter weights and emplacements for delicate instruments. At the southern end is a lattice tower and secret, intriguing gadgets. All this is part of Professor Smith's preparation for what ought to be the classic experiments on bird flight.

Lilienthal, Bocklin, Deprez, Hugo, Lancaster, Lowrie, Marey, Chanute and all the rest studied bird flight, but as yet no one has done much with it that took advantage of modern precision instruments. Shall we some day find Smith's name habitually associated with those above? — F. ALEXANDER MAGOUN, *Secretary*, Room 5-328, M. I. T., Cambridge, Mass. GRETCHEN A. PALMER, *Assistant Secretary*, 51 Houston Avenue, Milton, Mass.

## 1920

My pleadings for coöperation from some of you birds has not been entirely in vain as I was surprised and delighted to receive a call from Ed Ryer the other day. Ed was up here for the Christmas holidays, principally to show off his brand new son born November 16. Ed is with the Standard Accident Insurance Company of Detroit in the investment

end of the business. He is living in Burlington, Mich. He tells me that he sees Lebon Eksergian occasionally in Detroit, who is chief engineer of the Budd Manufacturing Company. It is a long time since we've heard anything of Eksergian and this was welcome news.

I have also received welcome news from Bunt Murphy, now settled down (at least temporarily from his world-wide wanderings) in Hartford as executive secretary of the Connecticut Children's Aid Society. Bunt still has the Far East in his blood so we mustn't be surprised if he takes a run over to Asia Minor or some such place. Maybe the fact that Richard Flagg Murphy arrived on November 23 will help to keep Bunt anchored. Bunt mentioned that he had seen Betty Thomas of Course VII in Pomfret, Conn.

I received an interesting Christmas card from Harold Dennison who, as you probably know, is the proprietor of the Dennison Airport at Atlantic, Mass. Judging from the card, Dennison has a family that he can be mighty proud of — a little girl five years old, a boy three, and the newest arrival, Harold T. Dennison, Jr., born December 12. — Ed Bragg can now be reached at 251 South Mariposa Avenue, Los Angeles. — Foster P. Doane has gone to Glens Falls, N. Y. — Dolly Gray has left Ridgewood, N. J., and is residing at Jackson Heights, N. Y., at 81114 34th Avenue. — Carl T. Leander is in Chicago. — Ken Newhall has moved to 51 Burrill Avenue, Lynn, Mass. — HAROLD BUGBEE, *Secretary*, 9 Chandler Road, West Medford, Mass.

## 1923

*Save the date, February 14, 1931 for the Valentine Party which is to be a dinner and dance for the Classes 1923, 1924, and 1925 at the Commodore Hotel, New York City. Formal dress is in order.*

First, is the coming joint formal dinner-dance and Valentine Party of the Classes of 1923, 1924, and 1925 in New York at the Commodore on February 14 which is announced at the beginning of this column. Pete Pennypacker reported this to me a month ago, but just too late to be mentioned in the January issue notes. Last year, the first dance of this kind was held at the Hotel McAlpin and proved a tremendous success. The forthcoming one promises to be the biggest event in the year by way of a '23 reunion in New York. I don't know just who is actually in charge of the affair, but I know that anyone of the following can probably supply information as to details: James Brackett (President of the 1923 New York group), who may be reached at the Harvard Law Club, Walt Marder, Jr., Box 474, Jersey City, or Lem Tremaine, 225 West 34th Street, New York City.

A bulletin which Walt Marder will send to any of the New York Alumni who haven't already received it, has been drawn up by F. P. Squibb outlining the proposed activities of the 1923 New York Club for the coming year. — It's surprising that with so many men around



1923 Continued

Boston, the local contingent here shows so little life as compared with our New York classmates. Announcement has been made of the date of the Annual Alumni Dinner in Boston. It is February 28 and here is a chance for the Boston crowd to see what kind of a turnout they can produce. I've been unable to attend this affair myself in the last few years because it seems I have been away on business each time. Probably others are similarly situated, but that can't account for the relatively small number turning up each year. Let's do better this time.

Jim Brackett called on me the first part of this month. He was visiting his folks here in Boston. Also I believe I failed to mention that when I was in St. Louis in November I spent part of a week-end with Joel Lund. Joel is still unmarried, a condition for which he takes no credit, and is very busy as production manager of the Lambert Pharmacal Company which a few of you may identify with Listerine. — Dean Lobdell recently sent me a copy of the annual report of the Minister of Finance of Ecuador for 1930. My knowledge of Spanish is too limited for me to fully appreciate its scope but it is an impressive 230-page report dealing with such items as banks, mines, public debt, commerce, and industry in that republic. Sixto E. Duran-Ballen is the Minister of Finance. He was a member of the Class of '23 for some two years and while I do not myself remember him, no doubt a number of others will.

The only real news item to report is from D. S. Davis, X, who announces the arrival of a daughter, Margarethe, on December 2. Davis is with the Mead Corporation at Chillicothe, Ohio. — Nearly every month we receive from the Alumni Office some 20 or more notices of address changes. Almost every one of them should provide an item of news to all members of the Class, involving as they frequently do changes in jobs or location of work, marriages, acquisitions of or additions to families and similar items of interest. Please don't be bashful about letting either Pete Pennypacker or myself know when events of this kind occur. — HORATIO L. BOND, *Secretary*, 31 Concord Avenue, Cambridge, Mass. JAMES A. PENNYPACKER, *Assistant Secretary*, Room 661, 11 Broadway, New York, N. Y.

## 1924

*Save the date, February 14, 1931 for the Valentine Party which is to be a dinner and dance for the Classes 1923, 1924, and 1925 at the Commodore Hotel, New York City. Formal dress is in order.* — HAROLD G. DONOVAN, *General Secretary*, 372 W. Preston Street, Hartford, Conn.

## 1925

*Save the date, February 14, 1931 for the Valentine Party which is to be a dinner and dance for the Classes 1923, 1924, and 1925 at the Commodore Hotel, New York City. Formal dress is in order.* — HENRY V. CUNNINGHAM, JR., *General Secretary*, 43 Chestnut Street, Boston, Mass.

## COURSE XV

Not long ago I received a card announcing the recent arrival of George David Keck on October 22, 1930. Dan, the proud father has not yet decided on the particular course which young George is to take at the Institute but then there is plenty of time for that. Dan has been a benedict since September 1928, and has been doing development engineering work with the Kimberly-Clark Corporation at Neenah, Wis. He writes: "Have seen few of the XV men since our dispersion in June 1925. It was with much regret that I had to forego the reunion last June. I have read with much interest all accounts of it I could locate."

One less bachelor in our ranks — Al Prentiss this time. He was married to Miss Winifred Marion Dickinson on November 15 at Deming, New Mexico. Al and his new boss are making their home in San Antonio, Texas at 236 Furr Drive. — I stopped in at the office of Dominick and Dominick in downtown New York in hopes of extracting some course news from Sam Spiker only to find that he had left them some months ago to become associated with the Federated Laboratories at 229 East 38th Street, New York City. — JOSEPH E. RUSSELL, *Secretary*, 8 Irvington Street, Boston, Mass.

## 1926

The general staff for our Reunion next June has been assembled. Ted Mangelsdorf wears the halo of commander-in-chief. Around him he has gathered a group which labors under the rather depressing title of executive committee: Dave Shepard, Eben Haskell, Bob Dean, and Frank Cramton. These gentlemen as a mark of responsibility have adopted uniforms very similar to that worn by Joe Cook in his latest Broadway opus, including the steam whistle on the hat and epaulets of Nirosta steel on the shoulders. The general reunion committee is composed of: Sid Brookes, Freddie Walch, Pop Constantine, Bill Meehan, Bill Rooney, Harold Willoughby, and Lee Cummings. From this general committee will be drawn the sub-committees headed by various members of the executive committee. The entire group with uniforms on and whistles blowing held a general staff meeting on Monday evening, January 6, the results of which will be reported in this column next month.

It is fairly definitely decided that the place will be somewhere on Cape Cod. The executive committee is diligently searching for some little inn that is fire-proof, damage-proof and far enough removed from the maddening throng so as to assure that it will not itself be maddened during the course of the reunion. The tentative date that has been set is Saturday and Sunday, June 6 and 7.

The most important piece of news that has come to the Secretary recently is that Dave Shepard has taken to dramatics. He is lending his talents to the Elizabeth

Dramatic Club of Elizabeth, N. J. Surely Dave will not for long waste his fragrance on the desert air and will move to the more glamorous boards of Broadway. We have not yet ascertained the particular play and part which has attracted his attention. Is he villain or hero? Is he declaiming in a tremulous voice "Would that I were a glove upon that hand that I might touch that cheek," or is he playing Bassanio to some charming Portia, or Cyrano to a belated Roxane, or is he playing villain in "Ten Nights in a Bar Room?" The Class should be more fully informed of the histrionic activities of its President.

Ernest Van Blarcom was recently limned in a little paper called the *Zinc Plant Electrifier* published at the Great Falls plant of the Anaconda Copper Company. Since it is an unalterable rule of this journal that poetry must not be used in these columns, we must reproduce the poem about him in prose. It goes as follows: "A stout New England man, well known to all as 'Van,' spliced two pair of pants for his broad expanse. Result — he looked like twins when he ran." — "Contributed in solemn appreciation of Ernest Van Blarcom's attempt to lower the cost of living." Van is getting along very well indeed and is reported to be happy in spite of his pants.

Willard Edwards who competes with Whitney Ashbridge in being the Class's most traveled man has recently communicated some of his experiences to your Secretary. They are too voluminous to be reproduced here. Suffice it to say as radio operator on a number of ships he has covered most of the sea lanes of the world. At the present time he has settled down in Denver, Colo., with his wife and son. He is with the American Tel. and Tel. in charge of circuit order coordination and its divisional headquarters at Denver. — B. V. Howe is State Sanitary Engineer for the Colorado State Board of Health. He is likewise married. — J. RHYNE KILLIAN, JR., *General Secretary*, Room 11-203, M. I. T., Cambridge, Mass.

## COURSE VI-A

Can anyone remember way back last spring to when he filled out one of Timbie's questionnaires? Well, I guess we were all surprised when we actually received the consolidated data of these questions and after a hurried glance over it we filed it away safely to remain until next time we moved or cleaned house. While the figures are interesting to note and figure on an average how long we have to wait before we earn a living wage, it does not show the comparative remunerative advantages of a VI-A training as against other methods of stuffing gray matter between our ears. Now that we have seen something of the cold, hard business world we have our own ideas about certain methods of teaching and from what I can gather some of it is at least not very flattering to them. However, when we can get some real dope on how we stand as compared with grad-

1926 Continued

uates of other courses and colleges, it will be time enough to decide concerning coöperative methods of teaching.

Our Class started out with an average of \$1700 per annum, increasing to \$2052 the first year and \$2457 the second year out, making an average yearly increase of \$379 per annum or about \$7.50 per week. These figures are based on reports from 31 of our classmates. So much for the past. What can we expect of the future?

Let us analyze how some of the classes ahead of us have fared. To do this, I will copy a few of Timbie's statistics:

## AVERAGE ANNUAL INCOME

Class	Start	2 Years		5 Years		7 Years	
		Out	In	Out	In	Out	In
'21	\$1552	\$2465	\$3410	\$3936			
'22	1563	2435	3820	....			
'23	1710	2455	3870	....			
'26	1700	2457	....	....			

From the second column, it will be seen that at this time we are about on a par with the other classes when they had put two years growth of grass between themselves and the "factory," although the classes of '21 and '22 started considerably below us. So far we seem to be closely following the class of '23 which would indicate that in three years we might hope for about \$3780 per annum on an average. Most of us will be in double harness by that time, it would seem by the reports of weddings, which means that we undoubtedly can exist on \$3800, but Packards will not adorn our garages, if any. — BENJAMIN P. RICHARDSON, *Secretary*, 29 South Second Street, Mount Vernon, N. Y.

## 1928

## COURSE I

Recent months haven't been productive of much news. Due to the depression and general scarcity of jobs, the gang is sitting tight on jobs now held and hoping they will not slide out from under them.

Early in December, an alumni banquet was held down at the Hotel New Yorker. In spite of a personal comment by Cy Meagher at the end of the printed form advertising the affair, this untrustworthy Secretary missed it and has yet to ascertain if '28 was represented in large or small numbers. Cy, by the way, is now working on subway construction and living in Yonkers. We haven't yet caught up with him to learn the exact address.

Bill Moore was in New York back in November. He's in Washington, D. C. with the Southern Railway. His work for the past couple of years has been on the economics of certain relocation projects on the Southern's lines. Another "railroader" is Claude Rice who has been on construction work in Missouri with the Rock Island for more than a year. — By indirect methods we heard that Bill Erickson is with a dredging company in Boston — no details available. — Most of you have probably read that Bill Beard has stepped into literature, being co-author with his father of

"The American Leviathan." We understand that Bill spent most of the last year on this task.

One word about one of our famous pairs. Senior and Schwartz, and we're through for this time. Senior started early last summer as a trainee with the Brooklyn Gas Company but soon left in favor of a job with the city subway system. Herm for the past year or so has had a good job with McGovern, contractor for a large new tunnel from Yonkers to Queens — an addition to the Metropolitan water supply system. — GEORGE P. PALO, *Secretary*, 1095 Jerome Avenue, New York, N. Y.

## 1929

Over the period of time that we have been privileged to publish our news as Alumni notes in *The Review*, Course I and Course XV secretaries have been the more active course secretaries. Too many of us just sit back and let a few do all the work. Our Alumni spirit should increase as time goes on. Let's get acquainted in 1931.

Joaquin Llansó, II, must be in Cincinnati this winter for a Christmas card bearing that stamp cancellation has just arrived. Nary a word as to his business there, however. — Warren Spofford, II, crashed through with a Christmas card, also, but he added for our enlightenment the news that he's in Schenectady with quite a group of Technology men. His work brings him into contact with a fine bunch from other colleges, as well, and he notes that though most of the bunch are "electricals," they are otherwise O.K. However, one should not be surprised on finding that most of his associates were "electricals" if he works in Schenectady. Rather hard on a lone "mechanical," I take it.

Brig Allen writes that he is still having a hard time giving away electric motors. He does seem to get a great deal of traveling on his job, however. Probably still looking for a market. He saw Charlie Denny in Pittsburgh the other day and called both Chuck Worthen and J. J. Wilson on the telephone. All of them are still with the same organizations as heretofore. Brig, too, is still trying to get the straight dope on Fish Hills, for it is rumored that he was married to Peggy Stranahan last February. Our best wishes and congratulations, Fish. — Jack Hallahan, I, left Philadelphia some time ago and probably is back in Boston awaiting an offer from some progressive company which is looking for a bright young engineer.

Fred Danner, XV, dropped in on Brig at his company's booth at the Power Show the first of the month in New York. He is doing some kind of traffic work for the Telephone Company and enjoying it.

Carlton E. Wood, VI, and Virginia Miller of Brooklyn, N. Y., have announced their engagement. The members of the Class join in extending their best wishes to the couple. — EARL W. GLEN, *General Secretary*, 339 Hillwood Drive, Akron, Ohio.

## 1930

## COURSE I

In response to my wretched appeal, Les Engler dropped me a very satisfactory letter. I quote from it: "Evidently, you are aware of the fact that I am putting in my time with the New York Telephone Company. I spent the first week and a half in New York City listening to lectures, mostly during the day. George Kloote, Jesse Billings, Dan Lucey (all Technology '30) and I roomed together while we were there. At the end of that time we were sent to the upstate area, where we separated somewhat. George went to Buffalo in the western division, Billings to the central division, and Dan Lucey and I stayed in the eastern. In fact, Lucey and I have been together ever since. We are all taking a training course that is supposed to last two and a half years. So far, I have completed the work with the construction and cable splicing forces, and have been living in Glens Falls during that time. At present I am located in Schenectady with the installers." Les further suggests that I might be able to worm out some of the details of the work from some of the other boys who are with the company. Incidentally, that includes Bill Locklin, according to my list of addresses. There are many of the fellows in New York, apparently, but I am in the dark about their work, as yet (Hope springs eternal, and so on). The address Les gives is 1018 Albany Street, Schenectady, N. Y.

A Canadian postmark appears on the letter I received from Mac MacDonald. Mac has found work as assistant engineer with the Saint John Harbor Commissioners. Saint John is his home, so he is one of a small number of the gang in that respect. He says in part: "At the present time, and also for the past two years we are working on a cofferdam which will be finished in about a week. When finished we are going ahead with the construction of a 1200-ft. pier of concrete. Altogether, I like the work very much and am pleased with being home after having been away for five years." Mac will be found at 263 Douglas Avenue, Saint John, N. B., Canada.

The next letter I have is from Bob Gardner who writes from the Tech Dorms in Cambridge. His account runs as follows: "After spending a few weeks recuperating from the strain of last June, and learning considerable about night navigation and stability in a canoe, I got a wire telling me to report immediately to Thief River Falls, Minnesota, for a job as rodman in a crew of the U. S. Biological Survey. Never heard of the place before or since, but was soon out among the Swedes and ten-foot mountains of northern Minnesota. We surveyed about 100 square miles of drained farm lands, lakes and swamps, for a duck preserve. Happy Homes for Contented Ducklings! Never did see such country, 25 miles of levels and the maximum difference in elevation of 20 feet! I learned a bit about surveying, saw some country, lost money, and was glad to get back



1930 Continued

after two months. Several of the boys are back. Don't think any of our gang has become an engine lab instructor as yet, however."

From what we see in the papers, the schools always have a jump in the enrollment when jobs are scarce. This year, Ted Green, Chew, Al Gutierrez, Mendall Thomas and Wu are taking graduate work. Ray Rolin is an assistant in one of the departments at school. There is still a bunch in and around Boston. I guess you just can't get away from the place. I find that this group includes Orm Lissak, Jim Muir, Sumner Fuller, and Louis LaPointe. I may be mistaken on some of these, but please remember a note will correct that deplorable situation.

Ced Roberts seems to be almost lost in the Big City. He writes: "Well, here I am in New York, and have been here since July, when I started work. I have not seen one of the fellows since I have been down here, and have only heard from Art England and Mendall Thomas. The former, as you probably know (yes, I had a letter from Art last fall to that effect), is with the State Highway Department of Connecticut, and the latter is back at the Institute for another year. As for me, I am working for the Erie Railroad Company in the Engineering Department. The work is mainly investigations of existing bridges and design reinforcement, although there is quite a lot of reconstruction. It is rather interesting and good experience in structures. The problems, though, are not as simple as they were back at school. I have had all kinds of bridges to deal with, from deck plate girders to multiple web trusses and one swing bridge. If you know of any of the fellows who are in New York, I'd like to know their addresses so I can look them up." Roberts' address is 250 Keap Street, Brooklyn, N. Y. There seem to be more of the gang around New York than anywhere else. Check this list: Bob Barrett, Walt Reed, Joe Rehler, Les Senior, Joe Westell, Harry Boehner, King Tow, Bill Eaton, and Johnny Falk.

Chicago is big enough for more than two of us, but two is all there is — there ain't no more. Brownie Taylor and I are out here, and even we live 13 miles apart. He is doing sanitary engineering work with the Sanitary District of Chicago. Now don't get the wrong idea, that doesn't mean that only a certain district in Chicago is sanitary! This town is new to him, so he and I have quite a bit to talk about, needless to say. He is at 1400 East 53rd Street, Chicago. At the present time I am working in Chicago for the Byllesby Engineering and Management Corporation. I am in the hydraulic engineering division, and am spending most of my time on research on dams and their design. Our company is expecting to start construction on a hydroelectric plant for the California Oregon Power Company soon, and I hope to be sent out there when they start. In the meantime, I have been enjoying myself to the best of my ability. I guess we all like to

be home for a while, and I no less than the rest. — RICHARD N. CHINDBLOM, *Secretary*, 5418 North Paulina Street, Chicago, Ill.

## COURSE XVI

The only real news from the Technology aeronautical engineers, Class of '30 came in an eight page letter from Fred Dickerman. Fred says he's sorry to hear that so many of us are looking for jobs when he's over there in Turkey loafing his time away and getting paid for it. The only things Fred has to do are to teach two sections of freshman physics, take charge of five lab sections (which unfortunately come in the afternoon) and attend at least five teas and two or three dinners every week. (He says he's supposed to look intellectual!) And can't you just see a Tech grad sipping tea like a genuine habitué of around 1400 Massachusetts Avenue — and he probably doesn't wear a crimson necktie, either.

Fred says Turkey is a queer country — haircuts 12½ cents, shines 2½ cents, pressing 25 cents, and street car fare 6 cents first class, or 4½ cents second class — the only difference being that there are more fleas in the second. All the taxi drivers have fine new American cars and always have a pal with them for company. A lot of them live in their taxis so they usually have closed cars. He says they really are trying to be progressive and are doing pretty well at that. They have just built a million dollar steel plant in Angora — might be a good chance for Bob Nelson. — I sure wish some more of you would come through as handsomely as Fred did.

Professor Newell says George Brady was in and away again this fall on short leave from Mr. Henry Ford's big airplane factory, and that George was on the pay roll when he left and hoped to be when he got back, but that things happened so rapidly out there that he couldn't be sure of himself. I suppose George was back east again for a football game or perhaps a little hunting. Wouldn't you know he would be? — Thompson has severed his connection with the Ford Company and is presumably hunting a job. As Newell says, "The hunting seems good at present, but it is all hunting — no finding." Hope this good man isn't running into quite this. — FRANK H. HANKINS, JR., *Secretary*, 62 Kensington Avenue, Northampton, Mass.

*Rocky Mountain Technology Club*

Our regular monthly meeting was held at the home of Clifford Wilfley '06, on December 4, 1930, with the following members present: Harold O. Bosworth '02, Dr. Severance Burrage '92, Willard E. Edwards '26, Arthur L. Hill '23, Benjamin V. Howe '26, Alvah E. Moody '17, Lyman F. Nivling '29, Maxwell Parshall '28, Frederick L. Peart '19, Benjamin F. Powell '23, Clifford R. Wilfley '06. The classes of '23 and '26 were tied in attendance with two members each.

## THE TECHNOLOGY REVIEW

Dr. Burrage (President) appointed Willard Edwards to be The Review Secretary, his specific duties being to compose the monthly letter to The Technology Review.

Letters were read by the Secretary from Professor Locke and others. A discussion of the World Wide Employment Agency followed and of the openings for two electrical engineers in this area mentioned in Professor Locke's letter. — Willard Edwards was called upon to relate some of his interesting experiences while a radio operator on a cruise around the world in 1928 and of other experiences while traveling on the seven seas. This was in accordance with a precedent established some time ago, whereby each member in turn accounts for his past life, both professional and otherwise, from the time of graduation to the present. Everyone enjoyed this part of the program. — WILLARD E. EDWARDS, JR., '26, *Secretary*, 417 Downing St., Denver, Colorado.

*Technology Association of Minnesota*

The Technology Association of Minnesota held its first meeting November 20, at the Minneapolis Athletic Club, Minneapolis. This was a luncheon meeting to meet Dr. Tryon of the Institute. There were 30 present. Twenty-one were Alumni and the other nine were a prospective student, fathers of students, and several prominent educators closely associated with the boys of Minneapolis and St. Paul.

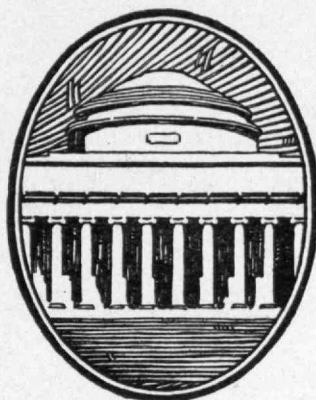
After luncheon the President, Clifford C. Hield '10, showed motion pictures of the convocation last spring, and then Dr. Tryon spoke interestingly of the Technology of today, its problems, aims, and achievements. — MILDRED L. COOMB, '20, *Secretary*, 4808 Garfield Avenue, Minneapolis, Minn.

*Technology Association of Northern California*

The Northern California Technology Association is progressing very satisfactorily. True, the Treasury is broke but that is nothing new or strange. We take up a dime collection at lunches occasionally to pay for post cards used for sending out notices.

On January 7, 1931 at 6:30 p.m. we held our long-threatened dinner, smoker, and "beer-bust" at the California Inn, 600 Turk Street, corner of Polk, San Francisco. This was an informal affair and arranged for a jollification and get-together. Tech men in the vicinity are urged to drop in at the Tuesday lunches at the Engineers Club, 206 Sansome Street, San Francisco. L. Standish Hall '14, is taking steps to start regular weekly lunches on the east side of San Francisco Bay in Oakland or Berkeley. An announcement will be made when plans are matured. — JOHN K. HELLER, '16, *Secretary*, 562 Sutter Street, San Francisco, Calif. Phone Garfield 5818.





# INFORMATION

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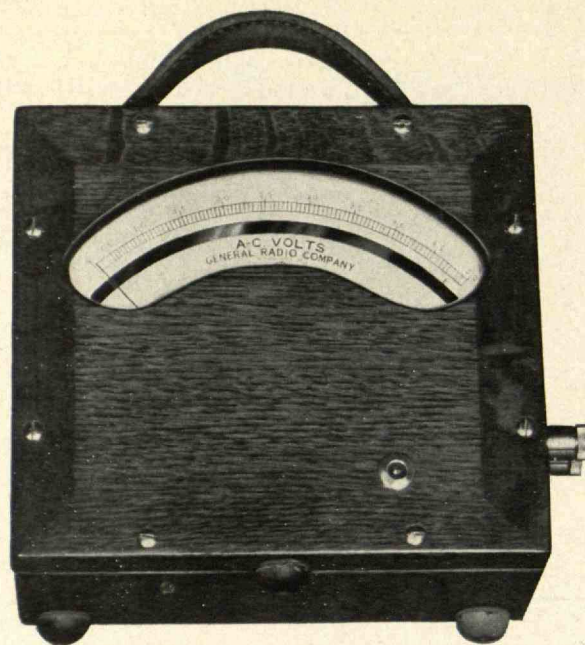
**Y:** For a popularly written explanation of Engineering Courses, ask for Bulletin Y.

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